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U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF PLANT INDUSTRY—BULLETIN NO. 101.

B. T. GALLOWAY, *Chief of Bureau.*

CONTENTS OF AND INDEX TO BULLETINS OF THE BUREAU OF PLANT INDUSTRY NOS. 1 TO 100, INCLUSIVE.

PREPARED BY

J. E. ROCKWELL,
EDITOR OF BUREAU.

ISSUED OCTOBER 12, 1907.

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1907.

BUREAU OF PLANT INDUSTRY.

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Editor, J. E. Rockwell.
Chief Clerk, James E. Jones.

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Plant Industry,
Office of the Chief,
Washington, D. C., August 21, 1907.

Sir: I have the honor to transmit herewith a manuscript entitled "Contents of and Index to Bulletins of the Bureau of Plant Industry Nos. 1 to 100, Inclusive," prepared by Mr. Julius Ensign Rockwell, Editor of this Bureau, and respectfully recommend its publication as Bulletin No. 101 of the Bureau series.

Respectfully,

B. T. Galloway,
Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

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B. P. I.—303.

CONTENTS OF AND INDEX TO BULLETINS OF THE BUREAU OF PLANT INDUSTRY NOS. 1 TO 100, INCLUSIVE.

INTRODUCTORY STATEMENT.

The work of the Bureau of Plant Industry, which was organized on July 1, 1901, is classified under the general subjects of Pathological Investigations, Physiological Investigations, Taxonomic Investigations, Agronomic Investigations, Horticultural Investigations, and Seed and Plant Introduction Investigations. Upon the organization of the Bureau the several series of bulletins of the various divisions incorporated in the Bureau—Vegetable Pathological and Physiological Investigations, Botanical Investigations and Experiments, Grass and Forage Plant Investigations, Pomological Investigations, and Experimental Gardens and Grounds—were discontinued, and all the scientific and technical publications prepared in these offices and in those subsequently organized have been issued in a single series of bulletins.

Attention is directed to the fact that "the serial, scientific, and technical publications of the United States Department of Agriculture are not for general distribution. All copies not required for official use are by law turned over to the Superintendent of Documents, who is empowered to sell them at cost." All applications for these bulletins should therefore be made to the Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by either a postal money order, an express money order, a draft on New York, or by cash. Postage stamps, foreign money, uncertified checks, and defaced or slick coin will not be accepted in payment for publications. No charge is made for postage on documents forwarded to points in the United States, Guam, Hawaii, Philippine Islands, Porto Rico, or to Canada, Cuba, or Mexico. To other countries the regular rate of postage is charged, and remittances must cover such postage.

Copies of all of these bulletins except Nos. 5, 16, 21, 23, 26, and 28 can be furnished by the Superintendent of Documents.

Since the publication of the last bulletin indexed in these pages (No. 100), the following bulletins of the Bureau series have appeared or are now in press, as indicated:

No. 101. [The bulletin now in the reader's hands.]
102. Miscellaneous Papers. I. Summary of Recent Investigations of the Value of Cacti as Stock Food. II. A Successful Dairy Farm. III. Planning a Cropping System. IV. The Application of Vegetative Propagation to Leguminous Forage Plants. V. The Control of Texas Root-Rot of Cotton. VI. The History of the Cowpea and Its Introduction into America. VII. A New Method for the Determination of Nicotine in Tobacco. 1907. Price, 15 cents.
103. Dry Farming in the Great Basin. 1907. Price, 10 cents.
104. The Use of Feldspathic Rocks as Fertilizers. 1907. Price, 5 cents.
105. The Relation of the Composition of the Leaf to the Burning Qualities of Tobacco. 1907. Price, 10 cents.
106. Seeds and Plants Imported. Inventory No. 12. [In press.]
107. American Root Drugs. [In press.]
108. The Cold Storage of Small Fruits. 1907. Price, 15 cents.
109. American Varieties of Garden Beans. 1907. Price, 25 cents.
110. Cranberry Diseases. [In press.]
111. Part I. The Larkspurs as Poisonous Plants. 1907. Price, 5 cents. Part II. The Fibers of Long-Staple Upland Cottons. 1907. Price, 5 cents. Part III. Imported Low-Grade Clover and Alfalfa Seed. [In press.]
112. The Use of Suprarenal Glands in the Physiological Testing of Drug Plants. 1907. Price, 10 cents.
113. The Comparative Tolerance of Various Plants for the Salts Common in Alkali Soils. [In press.]
114. Sap-Rot and Other Diseases of the Red Gum. [In press.]
115. The Disinfection of Sewage Effluents for the Protection of Water Supplies. [In press.]
116. The Tuna as Food for Man. [In press.]
117. The Reseeding of Depleted Range and Native Pastures. [In press.]
118. Peruvian Alfalfa. [In press.]

Since its organization the Bureau of Plant Industry has contributed the following papers to the series known as Farmers' Bulletins, copies of which will be sent without cost to any person in the United States or its possessions upon application to a Senator, Representative, or Delegate in Congress, or to the Secretary of Agriculture, Washington, D. C.:

No. 139, Emmer: A Grain for the Semiarid Regions; No. 140, Pineapple Growing; No. 147, Winter Forage Crops for the South; No. 148, Celery Culture; No. 154, The Home Fruit Garden: Preparation and Care; No. 156, The Home Vineyard, with Special Reference to Northern Conditions; No. 157, The Propagation of Plants; No. 161, Practical Suggestions for Fruit Growers; No. 164, Rape as a Forage Crop; No. 167, Cassava; No. 168, Pearl Millet; No. 174, Broom Corn; No. 175, Home Manufacture and Use of Unfermented Grape Juice; No. 176, Cranberry Culture; No. 181, Pruning; No. 185, Beautifying the Home Grounds; No. 188, Weeds Used in Medicine; No. 194, Alfalfa Seed; No. 195, Annual Flowering Plants; No. 198, Strawberries; No. 199, Corn

Growing; No. 204, The Cultivation of Mushrooms; No. 208, Varieties of Fruits Recommended for Planting; No. 213, Raspberries; No. 214, Beneficial Bacteria for Leguminous Crops; No. 215, Alfalfa Growing; [a] No. 217, Essential Steps in Securing an Early Crop of Cotton; No. 218, The School Garden; No. 219, Lessons from the Grain-Rust Epidemic of 1904; No. 220, Tomatoes; No. 221, Fungous Diseases of the Cranberry; No. 224, Canadian Field Peas; No. 229, The Production of Good Seed Corn; No. 231, Spraying for Cucumber and Melon Diseases; No. 232, Okra: Its Culture and Uses; No. 238, Citrus Fruit Growing in the Gulf States; No. 240, Inoculation of Legumes; No. 242, An Example of Model Farming; No. 243, Fungicides and Their Use in Preventing Diseases of Fruits; No. 245, Renovation of Worn-Out Soils; No. 246, Saccharine Sorghums for Forage; [a] No. 247, The Control of the Codling Moth and Apple Scab; No. 248, The Lawn; No. 250, The Prevention of Stinking Smut of Wheat and Loose Smut of Oats; No. 253, The Germination of Seed Corn; No. 254, Cucumbers; No. 255, The Home Vegetable Garden; No. 260, Seed of Red Clover and Its Impurities; No. 271, Forage-Crop Practices in Western Oregon and Western Washington; No. 272, A Successful Hog and Seed Corn Farm; No. 274, Flax Culture; No. 278, Leguminous Crops for Green Manuring; No. 279, A Method of Eradicating Johnson Grass; No. 280, A Profitable Tenant Dairy Farm; No. 282, Celery; [a] No. 283, Spraying for Apple Diseases and the Codling Moth in the Ozarks; [a] No. 284, Insect and Fungous Enemies of the Grape East of the Rocky Mountains; No. 285, The Advantage of Planting Heavy Cotton Seed; No. 286, Comparative Value of Whole Cotton Seed and Cotton-Seed Meal in Fertilizing Cotton; No. 288, Nonsaccharine Sorghums; No. 289, Beans; No. 291, Evaporation of Apples; No. 292, Cost of Filling Silos; No. 294, Farm Practice in the Columbia Basin Uplands; No. 299, Diversified Farming Under the Plantation System; No. 300, Some Important Grasses for the Gulf Coast Region; No. 301, Home-Grown Tea; No. 302, Sea Island Cotton; No. 304, Growing and Curing Hops; No. 306, Dodder in Relation to Farm Seeds; No. 307, Roselle: Its Culture and Uses.

In addition, the Bureau of Plant Industry has contributed the following papers to the Yearbooks of the Department of Agriculture from 1901 to date, all of which have been reprinted for distribution in separate form. The editions of those bearing numbers marked with a star (*) are exhausted. The others can be obtained without cost upon addressing a request therefor to the Secretary of Agriculture, Washington, D. C.

No. 225, The Relation of Nutrition to the Health of Plants; No. 229, Little-Known Fruit Varieties Considered Worthy of Wider Dissemination; *No. 230, Commercial Apple Orcharding; *No. 238, Agricultural Seeds—Where Grown and How Handled; *No. 242, Agriculture in the Tropical Islands of the United States; No. 246, The Home Fruit Garden; No. 254, The Hemp Industry in the United States; No. 262, The Contamination of Public Water Supplies by Algæ; No. 264, Industrial Progress in Plant Work; *No. 266, Top-Working Orchard Trees; *No. 277, Bacteria and the Nitrogen Problem; No. 278, Systems of Farm Management in the United States; No. 279, Improvement of Cotton by Seed Selection; No. 281, Grape, Raisin, and Wine Production in the United States; No. 283, Promising New Fruits; No. 284, Plants as a Factor in Home Adornment; No. 287, Improvement of Corn by Seed Selection; No. 290, Fertilizers for Special Crops; No. 291, Crops Used in the Reclamation of Alkali Lands in Egypt; *No. 293, Cultivation and Fertilization of Peach Orchards; *No. 310, The Cultivation of Corn; No. 314, The Growing of Long-Staple Upland Cotton; No. 317, Relation of Cold Storage to Commercial Apple Culture; No. 320, Relation of Sugar Beets to General Farming; No. 321, Principal Commercial Plant Fibers; *No. 323, A Model Farm; No. 325, Cultivation of Drug Plants in the United States; No. 326, Macaroni Wheat; No. 330, Promising New Fruits; No. 336, The Relation of Plant Physiology to the Development of Agriculture; No. 340, Opportunities in Agriculture: I. Growing Crops under Glass. II. Fruit Growing. III. General Farming; *No. 343, New Citrus Creations of the Department of Agriculture; *No. 349, Potato Culture near Greeley, Colorado; No. 351, Sugar-Beet Seed Breeding; No. 354, Some Uses of the Grapevine and Its Fruit; No. 356, Promising New Fruits; No. 358, The Improvement of Tobacco by Breeding and Selection; No. 361, Cotton Culture in Guatemala; *No. 363, Work of the Bureau of Plant Industry in Meeting the Ravages of the Boll Weevil and Some Diseases of Cotton; No. 367, Plant Diseases in 1904; No. 377, Diversified Farming in the Cotton Belt: I. South Atlantic Coast. II. Alabama and Mississippi. III. Louisiana, Arkansas, and Northeastern Texas. IV. Texas; No. 383, New Fruit Production of the Department of Agriculture; *No. 384, The Business of Seed and Plant Introduction and Distribution; No. 387, The Handling of Fruit for Transportation; No. 389, The Effect of Inbreeding in Plants; * No. 394, New Opportunities in Subtropical Fruit Growing; No. 399, Promising New Fruits; No. 401, Progress in Drug-Plant Cultivation; No. 409, Plant Diseases in 1905; No. 411, The Present Status of the Nitrogen Problem; No. 419, Range Management; No. 422, Methods of Reducing the Cost of Producing Beet Sugar; No. 427, New Citrus and Pineapple Productions of the Department of Agriculture; No. 429, Promising New Fruits; No. 431, New Tobacco Varieties; No. 437, Plant Diseases in 1906.

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[a] Contributed jointly by the Bureaus of Entomology and Plant Industry.

A report of the Chief of the Bureau of Plant Industry detailing the principal lines of investigation undertaken and the results accomplished during the preceding twelve months has been issued yearly both in connection with the Annual Report of the Secretary of Agriculture and in separate form.

The miscellaneous circulars and minor publications of the Bureau, referring to many different lines of work and appearing in various forms, do not bear consecutive numbers or constitute a regular series, and on account of limited editions not being available for distribution, even to public libraries, agricultural experiment stations, or to collaborators of the Department of Agriculture, they are not classed as "publications" and no announcement of their issue from the press is made by the Department.

J. E. Rockwell,
Editor of Bureau.

Washington, D. C.,
August 20, 1907.

LIST, WITH CONTENTS, OF BULLETINS OF THE BUREAU OF PLANT INDUSTRY NOS. 1 TO 100, INCLUSIVE.

A star (*) before a number indicates that the stock of the Department of Agriculture is exhausted and that collaborators can not be supplied with the bulletin so marked. Similarly, a star before a part of a bulletin shows that this part can not be furnished in separate form. Where a dagger (†) is used, the electrotype plates of the bulletin specified have been destroyed. Where no price is given (in the cases of Bulletins Nos. 5, 16, 21, 23, 26, and 28), the publication can not be furnished by the Superintendent of Documents.

* No. 1. The Relation of Lime and Magnesia to Plant Growth. I. Liming of Soils from a Physiological Standpoint. By Oscar Loew, Expert in Physiological Chemistry. II. Experimental Study of the Relation of Lime and Magnesia to Plant Growth. By D. W. May, of the Office of Experiment Stations. 1901. 53 pp., 3 pls. Price, 10 cents.

Contents: I. Liming of soils from a physiological standpoint: Introduction—Injurious action of magnesium salts—Theoretical discussion of the functions of lime and magnesia—The ratio between lime and magnesia in soils of different countries: Soils of America; soils from European countries; soils from Asiatic countries; soils from African countries; soils from Australia; river deposits—Some special physiological cases relating to the ratio between lime and magnesia—Correction of lime and magnesia content in soils. II. Experimental study of the relation of lime and magnesia to plant growth: Introduction—The rôle of lime in the soil—The rôle of magnesia in the soil—The object of the experiments—Lime and magnesia as nitrates and sulphates in water cultures: Results of experiments with cowpeas; results of experiments with privet—Lime and magnesia as carbonates in sand cultures: Experiments with tobacco; experiments with barley; experiments with oats, wheat, and beans—Lime and magnesia as carbonates in soil cultures: Experiments with oats and cowpeas—Lime and magnesia as nitrates in sand cultures: Experiments with wheat and oats; experiments with cowpeas; experiments with tobacco—Lime as sulphate and magnesia as carbonate in soil cultures: Experiments with cowpeas—Summary.

* † No. 2. Spermatogenesis and Fecundation of Zamia. By Herbert J. Webber, Physiologist, Vegetable Pathological and Physiological Investigations, Plant-Breeding Laboratory. 1901. 100 pp., 7 pls. Price, 20 cents.

Contents: Introduction: Summary of recent literature; acknowledgments—Methods and materials used—Development of microspores—Development of pistillate cones—Development of the pollen tube and prothallus: Germination of pollen and growth of prothallus; division of second prothallial cell; appearance and growth of blepharoplasts; growth of basal end of pollen tube—Division of the central cell—Metamorphosis of the spermatids—Structure and form of the mature spermatozoid—Movement of spermatozoids—Process of fecundation—Division of the fecundated egg cell—Is the blepharoplast a centrosome?—Summary—Bibliography—Explanation of illustrations.

No. 3. Macaroni Wheats. By Mark Alfred Carleton, Cerealist, Vegetable Pathological and Physiological Investigations. 1901. 62 pp., 11 pls., 2 figs. Price, 20 cents.

CONTENTS: Introduction—Characteristics of macaroni wheats—Distribution of macaroni wheats—Adaptability of durum wheats to our semiarid districts: Climatic comparisons; comparison of soils; experimental proof; testimony of private parties; testimony of experiment stations—The market for macaroni wheat: Foreign demand; quality of grain demanded; possibility of a home demand; kinds of wheat now used by our factories; comparison of foreign and domestic macaroni; preparation of semolina; bread from macaroni wheats—Cultivation of macaroni wheats: Preparation of the soil; methods of seeding; care in harvesting—Effects of local variations in soil and climate—Varieties: Gharnovka; Arnautka; Kubanka; Pererodka; Beloturka; Velvet Don; Black Don; Sarui-bugda; Medeah; Pellissier; Candeal; Nicaragua; Wild Goose; Missogen; Polish; winter varieties—Experimental comparison of varieties—Russo-Mediterranean traffic in macaroni wheat—Summary.

† No. 4. Range Improvement in Arizona. (Cooperative Experiments with the Arizona Experiment Station.) By David Griffiths, Expert in Charge of Field Management, Grass and Forage Plant Investigations. 1901. 31 pp., 6 pls., 5 figs. Price, 10 cents.

CONTENTS: Introduction—Former conditions—Circular letter and questions—Answers to questions—Feed on the range: The plantains; saltbushes and their allies; native legumes; the Cactaceæ; the grasses—The range reserve tract: Area C; area E; area F; area A; area B; area D—Precipitation records—Summary and suggestions.

*† No. 5. Seeds and Plants Imported through the Section of Seed and Plant Introduction for Distribution in Cooperation with the Agricultural Experiment Stations. Inventory No. 9, Numbers 4351–5500. 1902. 79 pp.

CONTENTS: Introductory statement—Inventory of seeds and plants imported—Index of common and scientific names.

† No. 6. A List of American Varieties of Peppers. By W. W. Tracy, jr., Assistant, Botanical Investigations and Experiments. 1902. 19 pp. Price, 10 cents.

CONTENTS: Introduction—List of abbreviations of names of seedsmen—List of varieties.

* No. 7. The Algerian Durum Wheats: A Classified List, with Descriptions. By Carl S. Scofield, Expert, Botanical Investigations and Experiments. 1902. 48 pp., 18 pls. Price, 15 cents.

CONTENTS: Introduction—Object of a descriptive classification of wheat varieties—Basis of present descriptions and classification: Structure of the wheat head; grain characters; relative value of characters—Glossary of terms used—General character of the durum wheats—Description of varieties with key: Aicha el Beida; Courtellement; Beloturka; Xeres; Poulot; Paros; Beliouni; Medeah; Caid de Siouf; Kahla; Trimenia; Hached; Boghar; El Aoudja; Tesdouni; M'Saken; Medeba; Meskiana; Caid Eleuze; Pelissier; Mohamed ben Bachir; El Hamra; Azizi; Maroc; Ouchda; Adjini; Zedouni; Aures; Moroccain; Nab el Bel; El Safra.

* † No. 8. A Collection of Economic and Other Fungi Prepared for Distribution. By Flora W. Patterson, Mycologist, Vegetable Pathological and Physiological Investigations. 1902. 31 pp. Price, 10 cents.

CONTENTS: Introduction—List of duplicate material prepared for free distribution and for exchange to the State Agricultural Experiment Stations and to persons interested in work upon fungi.

* No. 9. The North American Species of Spartina. By Elmer D. Merrill, Assistant Agrostologist, Grass and Forage Plant Investigations. 1902. 16 pp. Price, 10 cents.

CONTENTS: Technical descriptions of the grasses included in the genus Spartina.

† No. 10. Records of Seed Distribution and Cooperative Experiments with Grasses and Forage Plants. By F. Lamson-Scribner, Agrostologist, Grass and Forage Plant Investigations. 1902. 23 pp. Price, 10 cents.

CONTENTS: Purchase and collection of seeds, roots, and specimens—Cooperation with the stations authorized—Lines of investigations of forage problems—Articles of cooperation—Seed distribution: Distribution by packages; distribution by pounds; amounts of the several varieties distributed—Seeds to private individuals—System of keeping records—A list of experiment stations with which articles of cooperation have been signed—Conclusion.

* No. 11. Johnson Grass: Report of Investigations made during the Season of 1901. By Carleton R. Ball, Assistant Agrostologist, Grass and Forage Plant Investigations. 1902. 24 pp., 1 pl., 1 fig. Price, 10 cents.

CONTENTS: Description—Origin and distribution—Dissemination—Control: State laws—Eradication: Hand labor; cultivation; winter fallow; summer fallow; cultivation in crops; patented methods; use of chemicals; electricity—Utilization of Johnson grass—Summary.

* † No. 12. Stock Ranges of Northwestern California: Notes on the Grasses and Forage Plants and Range Conditions. By Joseph Burtt Davy, Assistant Botanist, Agricultural Experiment Station, University of California. 1902. 81 pp., 8 pls., 3 maps, 4 figs. Price, 15 cents.

CONTENTS: Introduction—Physical features of the region: Agricultural subdivisions; topography; climatology; temperature; precipitation; prevailing winds—Itinerary—Range conditions: The interior plateau region: mountain valleys; temperature; water supply; soils; agricultural products; the wild meadows and pastures; forage value of the wild meadows; improvement of pasture and meadow; forage plants recommended for trial; the upland ranges; temperature; precipitation; water supply; soils; the open, summer, or annual range; grasses and other forage plants; weeds; the prairies; the woodland or winter range; trees; underbrush; herbaceous plants; forage plants; improvement of the woodland forage; forage plants recommended for trial; the chaparral; subalpine meadows; system of range rotation and management; carrying capacity; present capacity; former capacity; range deterioration; primary cause; excessive land valuations; how overstocking effects deterioration; wild oats and alfilerilla; bunch-grasses; sheep versus cattle; summary; range preservation; formation of a seed bed; preserve the timber and brush; maximum versus optimum stocking; range renewal; range improvement—The coast-bluff belt: Climatology; the mesa lands; soils; grasses and other forage plants; the white-ash prairies; bottom lands; soils; forage crops; land values; sand dunes; native sand binders; methods of preventing drifting and reclamation of waste dunes; beach grass; sea lyme grass; utilization of sand dunes—The redwood belt—Fodder crops: Fodder crops now cultivated; plants recommended for cultivation or trial—Poisonous plants—Fungous parasites—Phytographic notes—Summary—Index.

* † No. 13. Experiments in Range Improvement in Central Texas. By H. L. Bentley, Special Agent, Grass and Forage Plant Investigations. 1902. 72 pp., 2 pls., 6 figs. Price, 10 cents.

CONTENTS: Introduction—History of the first year's work: Selection of the land; plan of experiments; carrying capacity of the pastures; seeding the ground; conclusions from the first year's work—History of the second year's work: Experiments with varieties; range improvement; catching wind-blown seeds; transplanting grass roots; baling legumes and fodder plants; exhibits at fairs; summary—History of the third year's work: Weather conditions; grass-garden work; a failure noted; a tentative success noted; experiments with grasses; native grasses the best; experiments with the coarser forage plants; range improvement; transplanting grass roots; the cultivation of pasture grasses—Summary: Cattle held on station pastures; the matter of cost—Hay and pasture plants recommended for central Texas: Grasses; barnyard grass; Bermuda grass; buffalo grass; bushy blue stem; Colorado grass; cotton top grass; crab grass; curly mesquite; everlasting grass; gama grass; grama grasses; black grama; blue grama; side oats grama; Johnson grass; knot grass; little blue stem; the millets; needle grass; rescue grass; the sedges; smooth brome grass; the sorghums; Texas blue grass; white top grass; wild rye; wild timothy; other central Texas grasses; legumes in central Texas; alfalfa or lucern; Turkestan alfalfa; oasis alfalfa; Florida beggarweed; the clovers; alsike clover; bur clover; mammoth clover; red clover; Russian red clover; sweet clover; white clover; peas and beans; cowpea; field pea; gram or chick pea; Metcalf bean; soy bean; sulla; velvet bean; vetches; spring vetch; hairy vetch; other forage plants; common oats and wheat; peanuts; rape; saltbushes; sanfoin; sweet potato; tallow weed; teosinte—Conclusion.

* No. 14. The Decay of Timber and Methods of Preventing It. By Hermann von Schrenk, Instructor in Henry Shaw School of Botany and Special Agent in Charge of Mississippi Valley Laboratory, Vegetable Pathological and Physiological Investigations. 1902. 96 pp., 18 pls., 27 figs. Price, 55 cents.

CONTENTS: Introduction: Scope of this report—Structure of timber: Wood cells, wood fibers, etc.; chemical nature of wood; mechanical nature of wood; life of the wood cells; heart and sap wood—Factors which cause the decay of wood: General remarks; agents which cause decay; how fungi and bacteria grow; rate of growth and decay; natural resistance of timber; sawn versus hewn timber; seasoned versus green timber; races of wood; variability in timber; summary—Timber preservation: Introduction; theory of impregnation; retrogressive changes which take place in impregnated wood—Results of timber impregnation: Introduction; experiment made in Texas—Results of timber impregnation in Europe—Ties, poles, etc.: Kinds of timber; form; tie specifications; splitting; stacking; summary—Ballast—Tie plates—Fastening—Methods of impregnation: Introduction; effect of seasoning after treatment; results of treatment; conclusions; creosoting; summary; zinc chloride and coal-tar oil; Hasselmann treatment; new processes; the senilization process; emulsion treatment; creo-resinate process; Ferrel process; conclusions—Removal and disposal of ties—Records—Conclusions and recommendations: Seasoning of timber; sawn and hewn timber; form of tie; preservative processes; changes which treated timber undergoes; utilization of inferior timbers; the growing of tie timber; causes of decay of timber—Bibliography—Appendix.

* † No. 15. Forage Conditions on the Northern Border of the Great Basin, Being a Report upon Investigations Made during July and August, 1901, in the Region between Winnemucca, Nevada, and Ontario, Oregon. By David Griffiths, Expert in Charge of Field Management, Grass and Forage Plant Investigations. 1902. 60 pp., 16 pls., 1 map. Price, 15 cents.

CONTENTS: Introduction—Description of the region: Precipitation record for 1900 and 1901—The soils: Description of soil samples; partial analyses of soil samples; forage plants growing on alkaline soils—Handling of stock—The range: Range conditions—Hay crops: Methods of handling hay—Sand binders—Weeds—Poisonous plants—Forage plants: The true sages; the salt sages and their allies; the clovers; the sedges and rushes; miscellaneous; the grasses—Summary—Index of common and scientific names.

* † No. 16. A Preliminary Study of the Germination of the Spores of Agaricus Campestris and Other Basidiomycetous Fungi. By Margaret C. Ferguson, cooperating with Vegetable Pathological and Physiological Investigations. 1902. 43 pp., 3 pls.

CONTENTS: Introduction—Methods—Experimental: Spore germination (preliminary study); extremes of temperature; action of an artificial digestive fluid; effect of acids on germination; acids followed by alkalies; effect of light on germination; age of the spores relative to their power of germination; a new factor in germination; effect of mycelium on germination; a list of substances tested—Conditions of growth: Coprinus micaceus; Hypholoma appendiculatum; Agaricus campestris—Historical—Bibliography—Appendix.

No. 17. Some Diseases of the Cowpea. I. The Wilt Disease of the Cowpea and Its Control. By W. A. Orton, Assistant Pathologist. II. A Cowpea Resistant to Root-Knot (Heterodera Radicicola). By Herbert J. Webber, Physiologist, and W. A. Orton, Assistant Pathologist. 1902. 38 pp., 6 pls., 1 fig. Price, 10 cents.

CONTENTS: I. The wilt disease of the cowpea and its control: Introduction—Description of the disease—Cause of the disease: Description of the fungus; manner of infection and spread; relation to other wilt diseases—Distribution—Extent of loss—Preventive measures: Rotation of crops; substitution of other crops; experiments with cowpeas and other crops. II. A cowpea resistant to root-knot (Heterodera radicicola): Introduction—Description of the disease—Plants affected—Extent of the disease—Methods of treating root-knot—The use of resistant varieties and stocks—A resistant cowpea—The breeding of nematode-resistant plants.

* † No. 18. Observations on the Mosaic Disease of Tobacco. By Albert F. Woods, Pathologist and Physiologist, Vegetable Pathological and Physiological Investigations. 1902. 24 pp., 6 pls. (including 3 in colors). Price, 15 cents.

CONTENTS: Introduction and historical summary—Translocation of starch—Artificial production of the disease—Infectious nature of the disease—Zymogen for oxidase and peroxidase—Preventive measures.

* No. 19. Kentucky Bluegrass Seed: Harvesting, Curing, and Cleaning. By A. J. Pieters, Botanist in Charge of Seed Laboratory, and Edgar Brown, Assistant Botanist, Botanical Investigations and Experiments. 1902. 19 pp., 6 pls., 3 figs. Price, 10 cents.

Contents: Introduction—Distribution of Kentucky bluegrass—Quality of seed required by the foreign trade—Adulteration—Source of the market supply—Factors controlling the profitable harvesting of seed—Yield per acre and total crop—Harvesting: Season; harvesting green seed; methods; kinds of strippers—Curing: Present methods; turning the ricks; heating; relative merits of indoor and outdoor curing—Cleaning—Effect of curing on the vitality of the seed: Germination tests; summary of results—Artificial curing—Conclusions.

No. 20. Manufacture of Semolina and Macaroni. By Robert P. Skinner, Consul General at Marseille. 1902. 31 pp., 5 pls., 6 figs. Price, 15 cents.

Contents: Introduction: A neglected opportunity; development of the industry in France; French metadiné wheats; growth of the demand for macaroni; need of growing the durum wheat—The market for durum wheat: Wild Goose wheat; prospective demand for American hard wheat and semolina; European methods and products; scouring the grain—Manufacture of semolina: Using wheat from different countries; cleaning the wheat; percentage of semolina in different wheats; importance of cleanliness; the milling process; classification of products—Manufacture of macaroni: The process; mixing the semolina; curing operations—Durum wheat for bread flour—Tables of exports, imports, and prices.

* No. 21. List of American Varieties of Vegetables for the Years 1901 and 1902. By W. W. Tracy, jr., Assistant, Botanical Investigations and Experiments. 1903. 402 pp.

Contents: Introduction—Rules of nomenclature—Rules for entering—List of abbreviations of names of seedsmen—List of varieties: Artichoke; asparagus; bush lima bean; green-podded bush bean; pole bean; pole lima bean; wax-podded bush bean; garden beet; sugar beet and mangel-wurzel; broccoli; Brussels sprouts; burnet; cabbage; cardoon; carrot; cauliflower; celeriac; celery; chervil; chicory; chives; chufas; collards; field corn; pop corn; sweet corn; corn salad; cress; cucumber; dandelion; eggplant; endive; fetticus; flag; French spinach; garlic; German celery; grass nuts; gumbo; herbs; horse-radish; kale; kohl-rabi; leek; lettuce; martynia; melon; muskmelon; mustard; okra; onion; orach; oyster plant; parsley; parsnip; pea; peanut; pepper; pieplant; pumpkin; radish; rampion; rhubarb; roquette; salsify; scolymus; scorzonera; skirret; sorrel; spinach; squash; sunflower; Swiss chard; tomato; garden turnip; ruta-baga; watermelon.

† No. 22. Injurious Effects of Premature Pollination; with General Notes on Artificial Pollination and the Setting of Fruit without Pollination. By Charles P. Hartley, Assistant in Physiology, Plant Breeding Laboratory, Vegetable Pathological and Physiological Investigations. 1902. 48 pp., 4 pls., 1 fig. Price, 10 cents.

Contents: Introduction—Experiments with tobacco blossoms: Microscopic study of tobacco pistils and ovaries—Experiments with blossoms of Datura tatula—Experiments with cotton blossoms—Experiments with orange blossoms—Experiments with tomato blossoms—Conclusion—Explanation of plates.

* No. 23. Berseem: The Great Forage and Soiling Crop of the Nile Valley. By David G. Fairchild, Agricultural Explorer for Seed and Plant Introduction. 1902. 20 pp., 14 pls.

Contents: Introduction—General uses—Varieties: Muscowi; Fachl; Saida—Use as a green fodder—Berseem as a hay crop—Conclusion—Description of plates.

No. 24. The Manufacture and Preservation of Unfermented Grape Must. By George C. Husmann, Expert in Charge of Viticultural Investigations, Pomological Investigations. 1902. 19 pp., 1 pl., 4 figs. Price, 10 cents.

Contents: Introduction—Historical notes—Composition of the grape—Causes of fermentation—Methods of preventing fermentation—Process used in California—Methods used in the Eastern States—Home manufacture—Uses of unfermented must—A few good recipes—Analyses of grape must—Prices and statistics.

No. 25. Miscellaneous Papers. I. The Seeds of Rescue Grass and Chess. By F. H. Hillman, Assistant, Seed Laboratory. II. Saragolla Wheat. By David G. Fairchild, Agricultural Explorer. III. Plant Introduction Notes from South Africa. By David G. Fairchild, Agricultural Explorer. IV. Congressional Seed and Plant Distribution Circulars, 1902–1903. 1903. 82 pp., 3 pls., 6 figs. Price, 15 cents.

Contents: The seeds of rescue grass and chess. Saragolla wheat. Plant introduction notes from South Africa: Introduction—Some Cape seedling grape varieties: The Red Hanepoot grape; Vitis rupestris metallica; Vitis rupestris Le Roux—Fruit-bearing hedge plants—Rhodes grass—The Kafir plum as a shade tree—The Rooibloem, a new corn parasite—The Natal pineapple. Congressional Seed and Plant Distribution circulars, 1902–1903: Plan of distribution and allotments—Distribution of novelties and specialties—Directions for planting bulbs—Distribution of cotton seed—Rivers Sea Island cotton—Sea Island cotton No. 224—Iron cowpea—Kleinwanzleben sugar beet—Distribution of tobacco seed and cultural directions.

* No. 26. Spanish Almonds and Their Introduction into America. By David G. Fairchild, Agricultural Explorer, Seed Introduction and Distribution. 1902. 16 pp., frontispiece, 7 pls.

Contents: Introduction—The almond industry in Spain: Varieties of Spanish almonds; method of planting and culture; gummosis of the almond—Possibility of establishing the Jordan almond in America—Description of plates.

No. 27. Letters on Agriculture in the West Indies, Spain, and the Orient. By David G. Fairchild, Agricultural Explorer, Seed and Plant Introduction and Distribution. 1902. 40 pp., 5 pls. Price, 15 cents.

Contents: Agriculture in the British West Indies—Jamaica yam cultivation—Opportunities for agricultural and botanical research in the Philippine Islands—Agricultural conditions in Spain—Notes on conditions in China—The Persian Gulf region—Breeds of milch cattle and carabaos for the Philippine Islands—Agriculture in Japan—Description of plates.

* No. 28. The Mango in Porto Rico. By G. N. Collins, Assistant Botanist in Tropical Agriculture, Botanical Investigations and Experiments. 1903. 38 pp., 15 pls.

CONTENTS: Introduction — Description — Origin — Culture: Requirements; methods of propagation; seed; inarching; layering; patch budding; cultivation; diseases—Uses: The canning of the green or ripe fruit; marmalade and jelly; chutney; alcohol; medicinal properties; dye, tan, and pigment; gum; minor uses in India—The mango in Porto Rico: Present status; best localities; Porto Rican forms; Mango de Mayaguez; Mangotina; Melocoton; Mango de rosa; Mango piña; Mango largo; Mango mangó; Mango jobos; Mango redondo; varieties to be introduced; Mulgoba; Alphonse, Aphoos, or Alfoos; No. 11; Manila; Mango china; Gordon; Peters; Julie; best method of introducing new varieties—Packing and shipping—Market—Summary—Description of plates.

† No. 29. The Effect of Black-Rot on Turnips: A Series of Photomicrographs, Accompanied by an Explanatory Text. By Erwin F. Smith, Pathologist, Laboratory of Plant Pathology, Vegetable Pathological and Physiological Investigations. 1903. 20 pp., frontispiece, 13 pls. Price, 15 cents.

CONTENTS: Introductory—General considerations—Plant furnishing the cultures—The method of inoculation, etc.—Symptoms which resulted—Technique employed in study of diseased plant—Special account of the diseased plant—Results of synchronous inoculations into other plants—Description of plates.

* No. 30. Budding the Pecan. By George W. Oliver, Expert, Seed and Plant Introduction and Distribution. 1902. 20 pp., frontispiece, 7 pls. Price, 10 cents.

CONTENTS: Difficulties encountered in pecan budding—Why the pecan should be budded—Raising seedling stocks—Selection of dormant buds—Location of the buds—Experiments with buds of the current season—An improved method of budding—Other methods of budding—Starting buds into growth—Transplanting budded trees—Description of plates.

No. 31. Cultivated Forage Crops of the Northwestern States. By A. S. Hitchcock, Assistant Agrostologist, in Charge of Cooperative Experiments, Grass and Forage Plant Investigations. 1902. 28 pp., 7 pls. Price, 10 cents.

CONTENTS: Description of the regions: Great Plains; Rocky Mountain region; Great Basin; interior valley of California; upper Pacific coast region; the "Inland Empire"—Forage crops: Alfalfa; general conditions; feeding value; seeding; making hay; Turkestan alfalfa; timothy; grain hay; redtop; awnless brome grass; velvet grass; clovers; forage crops of minor importance; Kentucky bluegrass; orchard grass; cheat; perennial rye grass; rape; field peas; vetches—Baling hay—Description of plates.

* No. 32. A Disease of the White Ash Caused by Polyporus Fraxinophilus. By Hermann von Schrenk, Special Agent in Charge of the Mississippi Valley Laboratory, Vegetable Pathological and Physiological Investigations. 1903. 20 pp., 5 pls., 1 fig. Price, 10 cents.

CONTENTS: Introduction—White rot: Geographical distribution; susceptibility to this disease; method of attack; description of diseased wood; the sporophore; microscopic changes in the wood; growth of the fungus in dead wood; remedies—Description of plates.

* No. 33. North American Species of Leptochloa. By A. S. Hitchcock, Assistant Agrostologist, in Charge of Cooperative Experiments, Grass and Forage Plant Investigations. 1903. 24 pp., 6 pls., 16 figs. Price, 15 cents.

Contents: Introduction—Key to species of the United States—History of genus—North American species—Species excluded—Description of plates.

* † No. 34. Silkworm Food Plants: Cultivation and Propagation. By George W. Oliver, Expert, Seed and Plant Introduction and Distribution. 1903. 20 pp., frontispiece, 12 pls. Price, 15 cents.

Contents: Introduction—Methods of reproduction: Propagation by cuttings; summer cuttings; winter cuttings; the cutting; preparations for planting cuttings; indoor spring cuttings; propagation by seeds; grafting and budding; root grafting; scion or sprig budding; shield budding; raising stocks for grafting and budding—Soil—Planting—Pruning—Description of plates.

No. 35. Recent Foreign Explorations, as Bearing on the Agricultural Development of the Southern States. By S. A. Knapp, Special Agent, Seed and Plant Introduction and Distribution. 1903. 44 pp., 6 pls., 2 figs. Price, 15 cents.

Contents: Introduction—Japan: Agricultural situation; acreage and yield of food crops; methods of rice culture; field work; cutting rice; manure; farm wages; cost of raising rice; farm life; general remarks—Ceylon: Agriculture; imports; farmhouses—India: Timber; extent of arable land; fertility of the soil; green manures; commercial fertilizers; crop rotation; public roads; conveyances; dress; country houses; villages; plows and scrapers; seeding and harvesting; rice farming; treatment of the seed bed and manuring; plowing and fertilizing; methods of cultivation; product per acre; harvesting; thrashing; wages; cost of cultivation; northern limit of culture; consumption of rice as food; acreage under cultivation; acreage under irrigation; live stock and farm implements; wells; rice produced; agriculture in the Punjab; cost of living; rice farming in Lower Burma; rice milling; rice for foreign markets; selection of seeds—China: Agricultural conditions; tillage of the soil; irrigation; cultivating, harvesting, and thrashing rice; hulling rice; production and cost of milling rice; cost of building, etc.; exportation of agricultural products—The Philippine Islands: Rainfall; temperature; range of products; stock and pasture lands; fodder plants; sugar cane; rice farming; fruits; timber.

* No. 36. The "Bluing" and the "Red-Rot" of the Western Yellow Pine, with Special Reference to the Black Hills Forest Reserve. By Hermann von Schrenk, Special Agent in Charge of the Mississippi Valley Laboratory, Vegetable Pathological and Physiological Investigations. 1903. 40 pp., 14 pls. (including 4 in colors). Price, 30 cents.

Contents: Introduction—Death of the trees: When are the trees dead—The "blue" wood: Rate of growth of the blue color; nature of the "blue" wood; strength of the "blue" timber; lasting power of the "blue" wood—The "blue" fungus: Effect of "blue" fungus on the toughness of the "blue" wood; relation of the "blue" fungus infection to the beetle holes; fruiting organs of the "blue" fungus; growth in artificial media; dissemination of the spores; the blue color; summary—Decay of the "blue" wood: The "red-rot" of the western yellow pine; cause of the "red-rot"; conditions favoring the development of the "red-rot" fungus; final stages and fruiting organs; rate of growth of "red-rot"—Amount of diseased timber—Possible disposal of the dead wood: In the Black Hills; in the remaining parts of South Dakota—Value of the dead wood—Inspection—Recommendations—Description of plates.

No. 37. Formation of the Spores in the Sporangia of Rhizopus Nigricans and of Phycomyces Nitens. By Deane B. Swingle, Assistant in Pathology, Laboratory of Plant Pathology. 1903. 40 pp., 6 pls. Price, 15 cents.

CONTENTS: Historical—Methods—Rhizopus nigricans Ehrbg.—Phycomyces nitens Kunze—General considerations—Summary—Index to literature—Description of plates.

* No. 38. Forage Conditions and Problems in Eastern Washington, Eastern Oregon, Northeastern California, and Northwestern Nevada. By David Griffiths, Assistant in Charge of Range Investigations. 1903. 52 pp., 9 pls. Price, 15 cents.

CONTENTS: Introduction—Itinerary—General account—Changes in the handling of the Washington ranges—Condition and plants of the range—Meadows and hay crops: Alfalfa; timothy and redtop; awnless brome; grain hay; cheat; root crops; native hay crops; wild wheat; bunch bluegrass; giant rye-grass; sprangle-top; miscellaneous forage plants—Reclamation of swamp lands—Needs of the region—Plants injurious to stock—Weeds of meadows and pastures—Diseases injurious to forage crops: Ustilago hypodites; Ustilago scolochloa; Tilletia fusca; Ustilago bromivora; Ustilago striaeformis—Summary and suggestions: Needs of the region; abuses; native grasses worthy of cultivation; wild wheat (Elymus triticoides); bunch bluegrass (Poa laevigata); short-awned brome (Bromus marginatus); mountain rye-grass (Elymus glaucus); bunch wheat-grass (Agropyron spicatum inerme); giant rye-grass (Elymus condensatus)—Index of grasses and forage plants—Description of plates.

* No. 39. The Propagation of the Easter Lily from Seed. By George W. Oliver, Expert, Seed and Plant Introduction and Distribution. 1903. 24 pp., 7 pls. Price, 10 cents.

CONTENTS: The Bermuda lily—Varieties of Lilium longiflorum from Japan—Deterioration of the Bermuda and Japan grown lilies—Recent efforts to cultivate the Easter lily in the United States—Lines of investigation carried on by the Department of Agriculture—Planting in the open ground—Reproduction from seed—Emasculating and pollenating the flowers—Sowing the seeds—Pricking off the seedlings—Description of plates.

* No. 40. Cold Storage, with Special Reference to the Pear and Peach. By G. Harold Powell, Assistant Pomologist in Charge of Field Investigations, and S. H. Fulton, Assistant in Pomology. 1903. 28 pp., 7 pls. (including 5 in colors). Price, 15 cents.

CONTENTS: The function of cold storage—The purposes of fruit storage—Influence of cold storage on the pear industry—Practical difficulties in pear storage—Outline of experiments in pear storage: The influence of the degree of maturity on keeping quality; the influence of delayed storage on keeping quality; the influence of different temperatures on keeping quality; the influence of the type of package on keeping quality; the influence of a wrapper on keeping quality; the influence of cold storage on the flavor and aroma of the fruit; the behavior of the fruit when removed from storage; summary—Influence of cold storage on the peach industry—Practical difficulties in peach storage—Outline of experiments in peach storage: General statement of results—Description of plates.

*No. 41. The Commercial Grading of Corn. By Carl S. Scofield, Expert, Grain Investigations. 1903. 24 pp., 4 pls. Price, 10 cents.

CONTENTS: Introduction—Inspection departments—Grain grading: Corn—Definite grade standards—Grade uniformity—Essential elements in grading corn—Apparatus required—Methods of determination: Moisture; color; damaged grains; broken grains and dirt—Classes and grades of corn—Inspection certificates—The cause of deterioration—Local and special grades—Description of plates.

*No. 42. Three New Plant Introductions from Japan. By David G. Fairchild, Agricultural Explorer. 1903. 24 pp., 6 pls. Price, 10 cents.

CONTENTS: Mitsumata, a Japanese paper plant: Introduction; species of paper plants in Japan; the mitsumata plant; the cultivation of mitsumata; the manufacture of mitsumata paper; the manufacture of leather paper—Udo, a new winter salad: Introduction; the cultivation of kan udo; the cultivation of moyashi udo—Wasabi, the horse-radish of the Japanese: Introduction; the cultivation of wasabi—Description of plates.

No. 43. Japanese Bamboos and Their Introduction into America. By David G. Fairchild, Agricultural Explorer. 1903. 36 pp., 8 pls. Price, 10 cents.

CONTENTS: Introduction—General considerations—General characters of the Japanese bamboos—Propagation of Japanese bamboos—Suitable location and soil conditions for bamboos—Japanese management of bamboo groves—Profits of bamboo culture in Japan—Culture of the edible bamboo—Different species of bamboos: Phyllostachys mitis; Phyllostachys quilioi; Phyllostachys henonis; "Madaradake" or "Ummon-chiku"; Phyllostachys nigra; Phyllostachys castillonis; Phyllostachys aurea; Phyllostachys bambusoides; Phyllostachys marliacea; Arundinaria japonica; Arundinaria simoni; Arundinaria hindsii; Arundinaria hindsii, var. graminea; Bambusa veitchii; Bambusa palmata; Bambusa quadrangularis; Bambusa vulgaris; "Shakutan"—Description of plates.

*No. 44. The Bitter-Rot of Apples. By Hermann von Schrenk, Special Agent in Charge of the Mississippi Valley Laboratory, and Perley Spaulding, Special Agent. 1903. 54 pp., 9 pls., 9 figs. Price, 15 cents.

CONTENTS: Introduction—Historical account of the bitter-rot—Distribution of the bitter-rot fungus: Geographical distribution; occurrence on various hosts—General description of the bitter-rot: Time of appearance; character of the spots; cause of the bitter-rot; rate of development of the bitter-rot; the diseased apple—The bitter-rot fungus: Life history on apples; the conidia; growth in cultures; conidial and ascus stages; the name of the bitter-rot fungus—The canker stage: Discovery of the canker; description of the canker stage—Relation of the cankers to the bitter-rot—Spread of the bitter-rot—Remedial measures: Removal of diseased fruits and mummies; removal of limb cankers; spraying with fungicides—Summary and recommendations—Index to literature—Description of plates.

No. 45. The Physiological Rôle of Mineral Nutrients in Plants. By Oscar Loew, Professor of Agricultural Chemistry in the Imperial University of Japan. 1903. 70 pp. Price, 5 cents.

CONTENTS: General remarks on the mineral constituents found in organisms: Historical notes; mineral compounds found in organisms; variety of functions of mineral substances; general value of certain mineral salts; the low atomic weight of the mineral nutrients—The physiological rôle of phosphoric acid: Relation of phosphoric acid to proteids and to the division of cells; the physiological importance of lecithin; phosphoric acid in chlorophyll; potassium phosphate as a cell constituent—The physiological rôle of silica—The physiological rôle of iron compounds: Relation between the coloring matter of the blood and of the leaf; influence of iron and other mineral nutrients on the formation of chlorophyll; fertilizing effect of iron salts; organic compounds containing iron; iron in fungi; manganese in plants—The physiological rôle of halogen compounds: Plants raised without chlorids; value of potassium chlorid for buckwheat; beneficial and injurious action of chlorids; absorption of chlorids by aquatic plants; sodium chlorid in animals; fluorids in physiological relations; behavior of plants to potassium bromid; relations of organisms to iodin compounds—The physiological rôle of alkali salts: Importance of potassium for the formation of starch and protein; beneficial action of sodium salts upon plants; necessity of sodium salts for animals; can potassium salts be replaced by rubidium salts in green plants and in animals?; behavior of fungi toward rubidium salts; physiological superiority of potassium salts—The physiological rôle of calcium and magnesium salts: Distribution of lime and magnesia in plants; the physiological importance of lime salts in plants; views on the functions of lime salts; formation of lime incrustations; can calcium in plant cells be replaced by strontium?; poisonous action of magnesium salts; life without lime salts; possible relations between lime and the transportation of starch; the physiological rôle of magnesium salts; increase of magnesia in oily seeds; necessity of magnesium salts for fungi; can magnesium salts be replaced by beryllium salts?; importance of lime salts for animals; proportions of lime and magnesia in animal organisms; behavior of animals to strontium salts and oxalates; final remarks.

* No. 46. The Propagation of Tropical Fruit Trees and Other Plants. By George W. Oliver, Expert. 1903. 28 pp., 8 pls. Price, 10 cents.

CONTENTS: Introduction—The mango: Prospects as a fruit tree; propagation in India; propagating tests at the Department; best age for wood; thick bark of mango an obstacle in budding; knife for budding the mango; methods which show best results; applying the buds; when to bud; selection of budding material; a second method of attaching the bud; raising seedling stocks; transplanting young seedlings; importing mango scions—The loquat: Regions where the loquat may be grown; raising seedling stocks—The fig: Cuttings; grafting and budding—Tea: Necessity for vegetative propagation; veneer grafting; herbaceous grafting; propagating house; cuttings—Manila hemp: Importance of introduction into the United States; raising plants from seeds; cultivation in the Philippine Islands—Description of plates.

* No. 47. The Description of Wheat Varieties. By Carl S. Scofield, Botanist in Charge of Grain Grade Investigations. 1903. 19 pp., 1 folding table, 7 pls. Price, 10 cents.

CONTENTS: Introduction—Explanation of form used in the description of wheat varieties—Description of plates.

No. 48. The Apple in Cold Storage. By G. Harold Powell, Assistant Pomologist in Charge of Field Investigations, and S. H. Fulton, Assistant in Pomology. 1903. 66 pp., 6 pls. (including 5 in colors). Price, 15 cents.

CONTENTS: Introduction—Influence of cold storage on the apple industry—The extent of the cold-storage warehousing industry—The function of the cold-storage warehouse—Principles of mechanical refrigeration: The utilization of the cold temperatures; the direct-expansion system; the brine-circulating system; the air-circulating system—Outline of experiments in apple storage—Factors influencing the keeping quality of apples: The maturity of the fruit when picked; how to obtain more uniform and better colored fruit; influence of delaying the storage of the fruit; influence of storage temperature; influence of a fruit wrapper; influence of cultural conditions; influence of the type of package—The behavior of the fruit when removed from storage—The importance of good fruit—Apple scald: Nature of the scald; influence of maturity of the fruit on scald; influence of temperature on scald; the temperature in which the fruit is removed from the storage house; influence on scald of delaying the storage of the fruit after it is picked; influence of a fruit wrapper on scald; varieties most susceptible to scald; treatment to prevent scald—Comparison of varieties in cold storage—Outline of cultural conditions—Variety catalogue—Summary—Description of plates.

* No. 49. The Culture of the Central American Rubber Tree. By O. F. Cook, Botanist in Charge of Investigations in Tropical Agriculture. 1903. 86 pp., 18 pls. Price, 25 cents.

CONTENTS: Introduction—The status of Castilla rubber culture: Castilla versus Hevea; uncertainties attending rubber culture; extent of the Castilla rubber industry; Castilla in the West Indies; Castilla culture for Porto Rico; rubber in the Philippines—Botanical study of Castilla: Difficulties in studying tropical trees; the original description of Castilla; description and botanical characters; species and varieties of Castilla; Hooker's monograph of Castilla; Costa Rican species of Castilla; field notes on Castilla in Guatemala and southern Mexico; habits of Castilla in the wild state; the rubber tree and the trumpet tree; Castilla not a genuine forest tree—Improvement of rubber trees by selection—Problems presented by the latex, or "milk": Evolutionary arguments regarding latex; functions ascribed to latex; the structure of latex; seasonal influences on latex; latex in desert plants; water storing as a function of latex; significance of multiple tapping—Climate and rubber production: A continuously humid climate not necessary for Castilla; greater abundance of Castilla on the drier Pacific slope; freer flow of milk in drier regions; decrease of milk with altitude and continuous humidity; Castilla in Nicaragua; Castilla in Costa Rica; Castilla on the Isthmus of Panama; analogy of the Assam rubber tree; the Para rubber tree in humid localities; productiveness of Para rubber trees in dry situations; the true climate of Hevea—The culture of Castilla: Shade in the culture of Castilla; shade not a necessity; relative cost of shade culture; effect of shade on form of tree; shade and rubber production; leguminous shade trees to be preferred; distance between trees; methods of clearing land for rubber planting; clean culture with forest protection; methods of handling Castilla seeds; seed beds and nurseries; propagation of Castilla from cuttings; Castilla as a shade tree—Extraction of the latex of Castilla: Primitive methods of tapping; age at which planted trees may be tapped; direction and shape of incisions; tapping instruments; multiple tapping; protection against thieves—Methods of coagulating the latex of Castilla: Coagulation by creaming; discoloration of Castilla latex; other methods of coagulation; coagulation of scrap rubber—Productiveness of Castilla: Yield of wild trees; yield of cultivated trees—Profits and prospects of Castilla culture: Management of rubber plantations; security of investments in rubber plantations; requirements for successful rubber plantations; opinion of the United States consul-general in Mexico—Concluding summary—Description of plates.

* No. 50. Wild Rice: Its Uses and Propagation. By Edgar Brown, Botanist in Charge of Seed Laboratory, and Carl S. Scofield, Botanist in Charge of Grain Grade Investigations. 1903. 24 pp., 7 pls. Price, 10 cents.

CONTENTS: Introduction—Distribution and habitat of the plant—Life history and natural propagation—Botanical description: General morphology; the root; the stem; the leaves; the panicle—Varieties—Diseases—Harvesting the seed—Preparation of the seed for food purposes—The food value of wild rice—Artificial propagation—Previous failures in planting—Plantings made in 1902—Storing seed—Suggestions for harvesting, storing, and planting—Description of plates.

* No. 51. Miscellaneous Papers. I. The Wilt Disease of Tobacco and Its Control. By R. E. B. McKenney, Physiologist. II. The Work of the Community Demonstration Farm at Terrell, Tex. By Seaman A. Knapp, Special Agent. *III. Fruit Trees Frozen in 1904. By M. B. Waite, Pathologist. IV. The Cultivation of the Australian Wattle. By David G. Fairchild, Agricultural Explorer. *V. Legal and Customary Weights per Bushel of Seeds. By Edgar Brown, Botanist in Charge of Seed Laboratory. VI. Golden Seal. By Alice Henkel, Assistant, and G. Fred Klugh, Scientific Assistant. 1905. 46 pp., 5 pls., 5 figs. Price, 5 cents.

CONTENTS: The wilt disease of tobacco and its control: The disease—Cause of the disease—Control of the disease. The work of the community demonstration farm at Terrell, Tex.: Introduction—Results accomplished—Methods employed—Description of the farm—Fertilizers used—Cotton—Corn. Fruit trees frozen in 1904: Introduction—Damage to bearing peach orchards: How to treat the peach orchards—Injury to plum trees—Injury to nursery trees—Damage to pear trees. The cultivation of the Australian wattle. Legal and customary weights per bushel of seeds: Introduction—Legal weights per bushel—Customary weights per bushel. Golden Seal: History—Habitat and range—Common names—Description of the plant—Description of the rhizome, or rootstock—Collection and preparation of the root—Diminution of supply—Cultivation: Necessary soil conditions; fertilizers; artificial shade; use of trees as shade; attention required; methods of propagation; experiments with seeds: experiments with divided rhizomes; experiments with plants from fibrous roots; yield of roots; time necessary to mature crop—Market conditions: Highest and lowest prices.

* No. 52. Wither-Tip and Other Diseases of Citrous Trees and Fruits Caused by Colletotrichum Gloeosporioides. By P. H. Rolfs, Pathologist in Charge of Subtropical Laboratory. 1904. 22 pp., 6 pls. (including 3 in colors), 1 fig. Price, 15 cents.

CONTENTS: Introduction—Distribution of the diseases—General method of attack: Extent of injury—Varieties attacked—Lime: Anthracnose; wither-tip; fruit canker—Lemon: Leaf-spot and wither-tip; lemon-spot; the coloring house: the coloring bed—Orange and pomelo: Leaf-spot: wither-tip—Description of the fungus: Synonymy—Preventive and remedial measures: Treatment to prevent lemon-spot; treatment of lime trees; the effect of pruning; cultivation and fertilization; fertilizers—Summary—Description of plates.

* No. 53. The Date Palm and Its Utilization in the Southwestern States. By Walter T. Swingle, Physiologist in Charge of Laboratory of Plant Life History. 1904. 155 pp., 22 pls., 10 figs. Price, 20 cents.

CONTENTS: Introduction—What is the date palm?—Date culture by the ancients—Propagation of the date palm: Seedling palms; seedling date palms for the Salton Basin; propagation of the date palm by offshoots; distances between trees; proportion of male trees that should be planted; varieties of male date palms—Care to be given date palms: The age at which date palms begin bearing; pollination of the date palm: gathering, curing, and packing dates—Types of dates and varieties suitable for culture in the United States: The three types of dates; varieties of dates suitable for culture in the United States; the Deglet Noor date; the Khalas date; other promising dates; the ordinary dates of commerce; varieties of dates that should be secured for trial in the United States; introduction of Saharan varieties of date palms into the United States—The date palm as a shelter for other fruit trees—Irrigation of the date palm: Amount of water necessary for a date palm; warm irrigation water advantageous—Drainage for the date palm—Effects of atmospheric humidity and rain on the date palm: Rainy weather disastrous to the flowers and ripening fruits of the date palm—Sunshine necessary for the date palm—Heat requirements of the date palm: Resistance of the date palm to cold in winter; the date palm flowers late in spring and escapes injury by late frosts; drainage of cold air and inversion of temperature in relation to date culture; hot summers necessary for the date palm; amount of heat required to mature the date—Effects of wind on the date palm—Resistance of the date palm to alkali: Investigation of the alkali-resisting power of the date palm in the Sahara; alkali conditions in relation to date culture at Biskra, Algeria; alkali conditions in relation to date culture at Fougala, Algeria; alkali conditions in relation to date culture at Chegga, Algeria; alkali conditions in relation to date culture at M'raïer, Algeria; alkali conditions in relation to date culture at Ourlana, Algeria; previous and subsequent analyses of alkaline soils from the Sahara; drainage water from alkaline soils used to irrigate date palms in the Sahara; alkali conditions in relation to date culture in the Salt River Valley, Arizona; alkali conditions in relation to date culture in the Salton Basin, California; geography and geology of the Salton Basin; water supply of the Salton Basin; soil conditions in the Salton Basin; alkali conditions at Palm Canyon in the foothills bordering the Salton Basin; chemical composition of the alkali of the Salton Basin; fertility of the soils of the Salton Basin; subsidiary cultures to follow in connection with date plantations on alkaline soils; limits of alkali resistance of the date palm; resistance of the date palm to chlorids; resistance of the date palm to sulphates; resistance of the date palm to carbonates (black alkali)—Regions in the United States where date culture can succeed: California; Salton Basin or Colorado Desert; Death Valley; Colorado River Valley; plateau region; interior valley region; coast region of southern California; Nevada; Arizona; Salt River Valley; Colorado River Valley; New Mexico; Texas—No danger from Mexican competition in date culture—Profits of date culture: Extent of the market—Importance of life-history investigations in demonstrating the feasibility of date culture—Summary—Description of plates—Index.

No. 54. Persian Gulf Dates and Their Introduction into America. By David G. Fairchild, Agricultural Explorer. 1903. 32 pp., 4 pls. Price, 10 cents.

CONTENTS: Introduction—General description of the region—Climate—Location of the date gardens—Soil conditions—Irrigation of the plantations—Secondary cultures between the palms—Treatment of the soil and planting of young palms—Pollination—Different varieties of the region: Bagdad varieties; Kustawi; Ascherasi; Bedraihe; Maktum; Burni; Zehedi; Barban; Sukeri; Taberzal; Mirhage; Bassorah varieties; Berhi; Hevezi; Sayer (or Ustaamran); Halawi; Khadrawi; Hassa varieties; Khalasa (or Khalasi); Jask varieties; Bunder Abbas varieties; Maskat varieties; Fard; Burni; Nagal; Mubsali; Khanezi; Khassab; Hellali; Guadur varieties—Diseases and pests—Cost and profits of date culture—Packing and shipment of dates—The date as a food—Description of plates.

N. 55. The Dry-Rot of Potatoes Due to Fusarium Oxysporum. By Erwin F. Smith and Deane B. Swingle, Laboratory of Plant Pathology. 1904. 64 pp., 8 pls., 2 figs. Price, 10 cents.

CONTENTS: Introduction—Effect of the disease on the plants—Effect of different fertilizers on resistance to the disease—Description of the fungus: Mycelium; Microconidia; Macroconidia; Chlamydospores; Sclerotia; growth in different media; growth in alkalis; growth in acids; growth in the absence of free oxygen; reaction to sunlight; range of temperature for growth; name of the fungus—Geographical distribution of the disease—Remedial measures—Culture media used—Summary—Literature—Description of plates.

* No. 56. Nomenclature of the Apple: a Catalogue of the Known Varieties Referred to in American Publications from 1804 to 1904. Compiled by W. H. Ragan, Expert in Pomological Nomenclature. 1905. [Additions and Corrections. 1905.] 395 pp. Price, 30 cents.

CONTENTS: Introduction—Code of nomenclature of the American Pomological Society: Priority; form of names; publication; revision—Key to the abbreviations used in citations of authors and publications: Alphabetical list of abbreviations used in designating the publications quoted—Catalogue of the known varieties of apples referred to in American publications from 1804 to 1904—Index to the American literature of the apple, 1804 to 1904—Additions and corrections.

No. 57. Methods Used for Controlling and Reclaiming Sand Dunes. By A. S. Hitchcock, Assistant Agrostologist, in Charge of Cooperative Experiments. 1904. 36 pp., 9 pls., 9 figs. Price, 10 cents.

CONTENTS: Introduction—Formation of sand dunes: Action of the wind upon drifting sand—Artificial fixation of dunes: Binding the sand; binding by means of grasses; transplanting; arrangement of the plantation; formation of the barrier dune; binding by means of heather; laying the heather; binding with sand hedges; forestation—Fixation as observed in Europe: The Netherlands; coastal dunes; interior dunes; Denmark; Oxböl; Skagen; Germany; France—Summary—Description of plates.

* No. 58. The Vitality and Germination of Seeds. By J. W. T. Duvel, Assistant in the Seed Laboratory. 1904. 96 pp., 2 figs. Price, 10 cents.

CONTENTS: Introduction—Materials and methods: Seeds; germination tests and apparatus—Effect of climatic conditions on the vitality of seeds—Causes of the losses in vitality in different climates—Effect of moisture and temperature upon vitality: Seeds packed in ice; effect of moisture on vitality at higher temperatures; summary—The effect of definite quantities of moisture on the vitality of seeds when they are kept within certain known limits of temperature—A comparison of methods of storing and shipping seeds in order to protect them from moisture, and consequently to insure a better preservation of vitality: Suggestions of earlier investigations; the necessity for thoroughly curing and drying seeds; character of the seed warehouse or storage room; the value of good seed to the market gardener; shipping seeds in charcoal, moss, etc.; nature of the experiments; disposition of the samples; results of the germination tests—Experiments in keeping and shipping seeds in special packages—Respiration of seeds: Summary—Enzymes in seeds and the part they play in the preservation of vitality—Summary—Literature cited—Index.

No. 59. Pasture, Meadow, and Forage Crops in Nebraska. By T. L. Lyon, Agriculturist, Nebraska Experiment Station, and A. S. Hitchcock, Assistant Agrostologist, in Charge of Cooperative Experiments, U. S. Department of Agriculture. 1904. 64 pp., 6 pls., 8 figs. Price, 10 cents.

CONTENTS: Introduction—Climatic and soil conditions of Nebraska: Rainfall; temperature; physiography; soil—Crops—Classification of forage plants: Duration; perennials; annuals; natural groups; legumes; grasses; miscellaneous; methods of utilizing the crops; pastures; meadows; soiling crops; silage—Results of experiments with grasses and forage plants at the Nebraska Experiment Station: Grasses and forage plants which have given successful results; brome-grass; results of cooperative experiments; alfalfa; cooperative experiments with alfalfa; alfalfa seed from different sources; Turkestan alfalfa; Peruvian alfalfa; Samarkand alfalfa; seed from different States; other experiments with alfalfa; meadow fescue; orchard grass; timothy;

clovers; Kentucky bluegrass; redtop; side-oats grama; wheat-grasses; grasses and legumes of less importance—Pastures and meadows: Native grasses; care of native pastures and meadows; tame pastures at the Nebraska Experiment Station; the seed bed for grasses and clovers—Annual forage crops: Sorghum; millet; cowpea; small grains; corn; soy bean; rape; Canada field pea; vetch—Plants which can not be recommended—Index of grasses and forage plants—Description of plates.

* No. 60. A Soft Rot of the Calla Lily. By C. O. Townsend, Pathologist. 1904. 47 pp., 9 pls., 7 figs. Price, 10 cents.

CONTENTS: Introduction—Cause of the calla rot—General appearance of the disease—Effect of the organism on the calla—Morphological characters of the organism—Physiological characters of the organism: Nutrient media; beef broth; agar plate cultures; agar streak cultures; agar stab cultures; beef agar, with iron sulphate; gelatin stab cultures; egg albumen; milk; litmus milk; litmus milk in nitrogen; Uschinsky's solution; Dunham's solution; Dunham's solution, with acid fuchsin; Dunham's solution, with indigo-carmine; peptone solution, with rosolic acid; Dunham's solution, with methylene blue; steamed potato cylinders; raw potato; raw eggplant; raw cauliflower; raw radish; raw cucumbers, sliced; raw cucumbers, whole; raw green peppers; raw mature onions bulbs; raw young onions; raw pieplant; raw cabbage; raw parsnips; raw carrots; raw turnips; raw salsify; raw tomatoes, ripe; raw tomatoes, green; raw apples (York Imperial); raw pineapples; raw yellow bananas; gas; action on lead acetate; indol; nitrates reduced to nitrites; maximum temperature; minimum temperature; optimum temperature; thermal death point; diffused light; direct sunlight; effect of nitrogen; effect of carbon dioxid; effect of hydrogen—Comparison of calla-rot germ with similar organisms: Bacillus carotovorus Jones; Bacillus oleraceæ Harrison; Heinz's hyacinth germ (Bacillus hyacinthi septicus); Potter's Pseudomonas destructans—Origin and spread of the disease—Remedies—Summary—Description of plates.

No. 61. The Avocado in Florida; Its Propagation, Cultivation, and Marketing. By P. H. Rolfs, Pathologist, in Charge of Subtropical Laboratory. 1904. 36 pp., 4 pls., 9 figs. Price, 5 cents.

CONTENTS: Introduction—The name avocado—Literature—Distribution and time of blooming—The avocado for wind-breaks and shade trees—Methods of starting an orchard: The seed bed; the nursery; cultivation in the nursery; budding; grafting; transplanting to the field; top-working trees; cultivation; fertilizers—Superiority of budded trees—Variation of fruit from seedling trees: Description of variations—Marketing: Picking; grading and sizing; packing—The fruit: The edible portion; seed and seed cavity—Shape of the tree—Forms and varieties: The Mexican avocado; the West Indian-South American avocado; the ideal avocado—Uses of the fruit—Diseases: Leaf disease; remedy; fruit disease; remedy—Summary—Description of plates.

No. 62. Notes on Egyptian Agriculture. By George P. Foaden, B. Sc., Secretary of the Khedivial Agricultural Society, Cairo, Egypt. 1904. 61 pp., 6 pls., 3 figs. Price, 10 cents.

CONTENTS: Introduction—Composition of Nile mud during flood—Irrigation and fertilizers—Soils—Labor—Value of land—Animal labor—Seasons—Cotton: Distance between the cotton beds; date of planting cotton; sowing cotton; watering cotton; manuring cotton; summary—Varities of cotton grown in Egypt: Ashmouni; lower Egypt cottons; Mit Afifi; Abbasi; Jannovitch—Seed selection—Picking cotton—Marketing cotton—Cotton and cotton-seed exports—Sugar cane—Beets—Berseem, or Egyptian clover—Lucern (alfalfa)—Corn—Wheat and barley—Beans—Rice—Onions—Millets and sorghums—Minor crops: Lentils; earth nuts, or peanuts; chick-peas; lupines; fenugreek; flax.

No. 63. Investigations of Rusts. By Mark Alfred Carleton, Cerealist in Charge of Cereal Investigations. 1904. 32 pp., 2 pls. in colors. Price, 10 cents.

CONTENTS: Additions to our knowledge of life histories: Euphorbia rust (Uromyces euphorbiæ C. and P.); sunflower rust (Puccinia helianthi Schw.); crown rust of oats (Puccinia rhamni [Pers.] Wettst.)—Segregaton of host plants: Black stem rust of Agropyron and Elymus; orange leaf rust of Agropyron and Elymus; black stem rust of Agrostis alba vulgaris; rust of Chloris (Puccinia chloridis Diet.); rusts of willow and cottonwood (Melampsora)—Winter resistance of the uredo: Uredo of Kentucky bluegrass rust (Puccinia poarum Niels.); uredo of Puccinia montanensis Ell.—Emergency adaptations: Puccinia vexans Farl.—Experiments with Lepto-uredineæ: Rust of cocklebur (Puccinia xanthii Schw.); rust of velvet leaf (Puccinia heterospora B. and C.)—Perennial species: Aecidium tuberculatum E. and K.; rust of Peucedanum fœniculaceum—Description of plates.

* No. 64. A Method of Destroying or Preventing the Growth of Algæ and Certain Pathogenic Bacteria in Water Supplies. By George T. Moore, Physiologist and Algologist in Charge of Laboratory of Plant Physiology, and Karl F. Kellerman, Assistant in Physiology. 1904. 44 pp. Price, 5 cents.

CONTENTS: Introduction—Microscopical examination of drinking water—Wide distribution of trouble caused by algæ in water supplies—Methods in use for preventing bad effects due to algæ—Desirability of other methods—Determination of a physiological method—Effect of copper sulphate—Method of applying the copper sulphate—Practical tests of the method: Water-cress beds; water reservoirs—Effect of copper upon pathogenic bacteria: Typhoid; Asiatic cholera—Comparison of effect of other disinfectants—Colloidal solutions—Conclusions: Necessity of knowledge of organism and condition in reservoir; application of method for destruction of pathogenic bacteria not designed to replace efficient means of filtration already in use; medicinal use; conditions under which the Department of Agriculture can furnish information and assistance in applying this method—Cost—Summary.

No. 65. Reclamation of Cape Cod Sand Dunes. By J. M. Westgate, Assistant in Sand-Binding Work. 1904. 38 pp., 6 pls. Price, 10 cents.

CONTENTS: Introduction—Ecological relations of the vegetation: Ecological factors; mode of deposition of the Cape sands; development of the dune range; natural reclamation; areas receiving gradual accumulations of sand; areas not receiving gradual accumulations of sand; marshes and bogs; early accounts—Devastation of the established dune areas: Early conditions incident to the devastation; restrictive legislation—Artificial reclamation of the Cape sands: Early work of sand control; recent work by the State; preliminary operations; attempts without beach grass; utilization of beach grass; relative merits of spring and fall planting; selecting and transplanting the sets; cost of planting; present status of the various plantings; effectiveness of brush laying; efficiency of beach grass for sand binding; necessity of ultimate forestation; miscellaneous operations on the sand; road construction; reclamation of small areas; commercial utilization of sand; development of the protective beach ridge—The Province lands: State ownership; value of the lands—Summary—Bibliography—Description of plates.

* No. 66. Seeds and Plants Imported During the Period from September, 1900, to December, 1903. Inventory No. 10; Nos. 5501–9896. 1905. 333 pp. Price, 15 cents.

CONTENTS: Introductory statement—Inventory of seeds and plants imported—Index of common and scientific names.

No. 67. Range Investigations in Arizona. By David Griffiths, Assistant in Charge of Range Investigations. 1904. 62 pp., 10 pls., 1 fig. Price, 15 cents.

CONTENTS: Introduction—The small inclosure—The large inclosure: Topography; soil; brush and timber; forage plants; amount of feed produced—Carrying capacity—Water for stock—The seasons—Erosion—The prairie dog—Range feed: The grasses; pigweed family; the clovers; alfilerilla; miscellaneous winter and spring annuals; miscellaneous browse plants—Hay crops—Weeds—Plants injurious to stock—Summary—Description of plates.

* No. 68. North American Species of Agrostis. By A. S. Hitchcock, Systematic Agrostologist in Charge of Herbarium. 1905. 68 pp., 37 pls., 2 figs. Price, 10 cents.

CONTENTS: Introduction: Taxonomy; nomenclature; plates; specimens listed—History of the genus—Generic description—Key to species—Description of species—Species excluded—Notes on Mexican species—Index to species and synonyms—Description of plates.

No. 69. American Varieties of Lettuce. By W. W. Tracy, jr., Assistant, Variety Trials. 1904. 103 pp., 27 pls. Price, 15 cents.

CONTENTS: Introduction—Varieties and their description: Nomenclature; environment and selection; source of seed—Cultural peculiarities—Terms used in description: Classes; size; maturity; shooting to seed; habit; leaves; color; seeds; seedling plants—Varieties suited to different conditions and requirements—Table of varieties—Classification of varieties—Key to varieties—Description of varieties classed as distinct—Catalogue of variety names.

No. 70. The Commercial Status of Durum Wheat. By Mark Alfred Carleton, Cerealist in Charge of Cereal Investigations, and Joseph S. Chamberlain, Physiological Chemist, Cereal Investigations. 1904. 70 pp., 5 pls., 1 fig. Price, 10 cents.

CONTENTS: Introduction—Proper rank of durum wheat—Special qualities of commercial value—The name "durum"—Durum wheat for macaroni: Characteristics of good macaroni; process of manufacture; list of manufacturers of macaroni in the United States; possibility of export of semolina and macaroni; methods of cooking and serving macaroni; recipes; semolina; soups; macaroni with cheese or milk; macaroni with tomatoes; macaroni with meats; macaroni with nuts; timbales; croquettes; garnitures; spaghetti; salads; desserts; special Italian recipes; miscellaneous—Durum wheat for bread: Private experiments; cooperative baking experiments of the Department of Agriculture; chemical study of durum-wheat flour and bread; examination of standard flours; total proteids; gliadin and glutenin; conclusions; examination of the flour and bread of the baking test; conclusions; reports on trials of the bread; grain dealers; millers; bakers; teachers and experts in domestic science; chemists and flour experts; technical journals; quotations from particularly interesting reports; results of other tests; remarks on the various chemical and baking tests; the color of flour and bread; experience required for perfect operations—Other products from durum wheat—Progress of the new industry: Increase in production of durum wheat; determination of the best varieties; commercial inspection and grading; disposition of the 1903 crop; mills now handling the wheat; prices; the outlook—Description of plates.

* No. 71. Soil Inoculation for Legumes; with Reports upon the Successful Use of Artificial Cultures by Practical Farmers. By George T. Moore, Physiologist in Charge of Laboratory of Plant Physiology. 1905. 72 pp., 10 pls. Price, 15 cents.

Contents: Introduction—The fixation of free nitrogen—Beneficial effect of leguminous crops—Direct effect of nodules upon legumes—Effect of nodule-bearing legumes upon succeeding crops—Artificial inoculation of the soil—Soil transfer—Nitragin—Nature of the organism—Cross-inoculation and specific characters—Methods of cultivation—Effect of varying conditions: Light, heat, and air; acids and alkalis; nitrates; moisture—Where is nitrogen fixed?—Nodules not always beneficial—Symbiosis or parasitism?—Infection and fixation of nitrogen without nodules—Inoculation by pure culture—Methods of using liquid culture—Time of inoculation—When inoculation is unnecessary—When inoculation is necessary—When to expect failure with inoculation—Results—Reports: Alfalfa; red clover; cowpeas; garden peas; beans; soy beans; hairy vetch; crimson clover; sweet peas; field peas; velvet beans; berseem; peanuts; miscellaneous—Summary.

* No. 72. Miscellaneous Papers. I. Cultivation of Wheat in Permanent Alfalfa Fields. By David Fairchild, Agricultural Explorer. II. The Salt Water Limits of Wild Rice. By Carl S. Scofield, Botanist, Grain Grade Investigations. * III. Extermination of Johnson Grass. By W. J. Spillman, Agrostologist. * IV. Inoculation of Soil with Nitrogen-Fixing Bacteria. By A. F. Woods, Acting Chief of Bureau. 1905. 30 pp., 3 pls., 4 figs. Price, 5 cents.

Contents: Cultivation of wheat in permanent alfalfa fields. The salt-water limits of wild rice: Introduction—The method of testing salinity—The regions investigated—Conclusions. Extermination of Johnson grass: Introduction—Character of the soil—Methods of treatment—Implements used—The production of hay. Inoculation of soil with nitrogen-fixing bacteria: Introduction—The commercial production of cultures—When inoculation is necessary—When inoculation may prove advantageous—When inoculation is unnecessary—When failure is to be expected—Cost of cultures—Increasing cultures—Preparing and using the culture solution—Keeping cultures for future use—Danger of inoculation by soil transfer—Pure-culture inoculation.

* No. 73. The Development of Single-Germ Beet Seed. By C. O. Townsend, Pathologist, and E. C. Rittue, Assistant. 1905. 26 pp., 8 pls., 6 figs. Price, 10 cents.

Contents: Introduction—Single and multiple germ beet seed—The beet flower—The first seed selection—Germination and vitality—Greenhouse experiments—Seed beets in 1903—Beet seed in 1903—Change of location of experiments—Progress of the work in 1904: Planting and growth of the seed beets; arrangement of single flowers; methods of pollination; gathering the seed; percentage of single-germ seeds—Conclusion—Description of plates.

No. 74. The Prickly Pear and Other Cacti as Food for Stock. By David Griffiths, Assistant Agrostologist in Charge of Range Investigations. 1905. 48 pp., 5 pls., 1 fig. Price, 5 cents.

Contents: Introduction—History—Geographical distribution of economic cacti in the United States—Methods of feeding: Singeing the spines; singeing with a torch; steaming; chopping by machinery; other chopping devices;

removal of the edge of the joints; handling the plants—Pear machinery: Origin of pear machinery; pear cutters; pear burners—Pear for milk production: Some dairy rations including pear—Pear for fattening and maintaining cattle—Pear as a hog feed—Pear for sheep and goats—Pear as a ration for working animals—Effect of pear upon stock—Cactus for the silo—Pear thickets and their destruction—Species of cactus which are of forage value—Establishing plantations of pear—Yield of pear—Behavior of pear after harvesting—Other economic aspects of the cacti—Some conditions obtaining in the prickly-pear region—Popular postulates of cactus feeding—Description of plates.

No. 75. Range Management in the State of Washington. By J. S. Cotton, Assistant in Range Investigations, in Cooperation with the Washington State Experiment Station. 1905. 28 pp., 3 pls. Price, 5 cents.

CONTENTS: Introduction—Range improvements: Winter pastures; semiarid lands; mountain grazing areas—Protection of pastures—Alternation of pastures—Using pastures before ground is settled in the spring—Improvement of stock—Index of grasses and forage plants—Description of plates.

No. 76. Copper as an Algicide and Disinfectant in Water Supplies. By George T. Moore, Physiologist and Algologist in Charge of the Laboratory of Plant Physiology, and Karl F. Kellerman, Assistant in Physiology. 1905. 55 pp. Price, 5 cents.

CONTENTS: Introduction—Difference in toxicity of copper sulphate in laboratory and field conditions—Effect of copper sulphate upon fish—Conditions determining the proper quantity of copper sulphate for eradicating algæ—Appearance of resistant forms of algæ in reservoirs previously treated—Odor and taste due to large numbers of algæ killed—Reports from various cities and towns upon the effect of treatment: Baltimore, Md.; Bond Hill, Cincinnati, Ohio; Butte, Mont.; Cambridge, N. Y.; Elmira, N. Y.; Fieldhome, N. Y.; Glencove, Long Island, N. Y.; Greenwich, Conn.; Hanover, N. H.; Hanover, Pa.; Ivorydale, Ohio; Johnson Creek, Wis.; Middletown, N. Y.; Millersburg, Pa.; Moncton, New Brunswick; New York, N. Y.; Newtown, Pa.; Oberlin, Ohio; Passaic, N. J.; Port Deposit, Md.; Rhinebeck, N. Y.; Scarboro, N. Y.; Springfield, Ill.; Waltham, Mass.; Water Mill, Long Island, N. Y.; Wellsboro, Pa.; Winchester, Ky.; Winnebago City, Minn.—Necessity for determining the polluting organism—Troublesome forms and their identification: The Sedgwick-Rafter method of quantitative determination; key for identifying algæ—Method of applying copper sulphate—Sterilization of bacteria-polluted water by means of copper sulphate—Sterilization of the water supplies at Columbus, Ohio, and Albuquerque, N. Mex.—Sterilization of water by means of metallic copper—Copper in the disposal of sewage—Copper supplementing the use of filters—Copper treatment and filtration at Anderson, Ind.—Objections to the use of copper sulphate—Opinions of toxicologists upon the effect of copper sulphate—Medicinal use of copper—Conclusion—Summary.

No. 77. The Avocado, a Salad Fruit from the Tropics. By G. N. Collins, Assistant Botanist in Investigations in Tropical Agriculture. 1905. 52 pp., 8 pls. Price, 5 cents.

CONTENTS: Introduction—Origin and history: Early accounts; common names; not native in the West Indies; distribution—Description—Botanical affinities—Varieties—Geographical types: Guatemala; Porto Rico; Mexico; Costa Rica; Cuba; Hawaii—Culture: Propagation by seed; asexual propagation; soil; climate; cultivation; improvement; shipping qualities; uniformity; extension of season; seed reduction; texture; flavor; yield; size; resistance to cold—Diseases—The avocado in Porto Rico—The avocado in Hawaii—The avocado in Florida—The avocado in California—Bearing age and life of tree—Yield—Harvesting: Time to pick; method of gathering; packing and shipping—Cold storage—Marketing: Market season—Methods of eating—Food value—Cost of production—Summary—Description of plates.

* No. 78. Improving the Quality of Wheat. By T. L. Lyon, Agriculturist and Associate Director of the Agricultural Experiment Station of Nebraska, and Collaborator of the Bureau of Plant Industry. 1905. 120 pp. Price, 10 cents.

CONTENTS: Object of the investigation. Part I. Historical: Some conditions affecting the composition and yield of wheat: Composition as affected by time of cutting; influence of immature seed upon yield; influence of climate upon composition and yield; influence of soil upon composition and yield; influence of soil moisture upon composition and yield; influence of size or weight of the seed-wheat kernel upon the crop yield; relation of size of kernel to nitrogen content; influence of the specific gravity of the seed kernel upon yield; relation of specific gravity of kernel to nitrogen content; conditions affecting the production of nitrogen in the grain. Part II. Experimental: Some properties of the wheat kernel—Yield of nitrogen per acre—Method for selection to increase the quantity of proteids in the kernel—A basis for selection to increase the quantity of proteids in the endosperm of the kernel—Improvement in the quality of the gluten—Some results of breeding to increase the content of proteid nitrogen—Yield of grain as affected by susceptibility to cold—Yield and nitrogen content of grain as affected by length of growing period—Relation of size of head to yield, height, and tillering of plant—Summary and conclusions.

No. 79. The Variability of Wheat Varieties in Resistance to Toxic Salts. By L. L. Harter, Scientific Assistant, Laboratory of Plant Breeding. 1905. 48 pp. Price, 5 cents.

CONTENTS: Introduction—Salts used—Varieties selected: Preston; Turkey; Zimmerman; Kharkof; Padui; Chul; Budapest; Kubanka; Maraouani—Methods of experiments—Method of establishing the toxic limits—Results of experiments: With magnesium sulphate; with magnesium chlorid; with sodium carbonate; with sodium bicarbonate; with sodium sulphate; with sodium chlorid; summary of tables—Comparison of results with different species—Ash analyses—Individual variability—Neutralizing effect of the salts employed upon other toxic substances—Dilute solutions as stimulants—Practical value of results—Summary—Bibliography.

No. 80. Agricultural Explorations in Algeria. By Thomas H. Kearney, Physiologist, Vegetable Pathological and Physiological Investigations, Bureau of Plant Industry, and Thomas H. Means, Formerly of the Bureau of Soils. 1905. 98 pp., 4 pls. Price, 10 cents.

CONTENTS: Introduction—Topography: Coast region; high plateau or steppe region; desert region—Climate: Coast region; temperature; humidity; precipitation; wind; high plateau region; desert region; temperature; humidity; precipitation—Irrigation: Coast region; high plateau region; desert region—Soils: Coast region; littoral zone; valley and plain zone; mountain zone; high plateau region; desert region; saline soils; coast region; desert region; soil management; rotations; fertilizers; preparation of the land; clearing and leveling; plowing—General economic conditions: Historical and political; land values; farm labor; agriculture of the native population; among the Arabs; among the Kabyles; among the Saharans—Crops of the colony: Geographical distribution; coast region; littoral zone; valley and plain zone; mountain zone; high plateau region; desert region; principal crops in detail; fruit crops; grapes; wine grapes; table grapes; olives; figs; citrus fruits; dates; less important orchard crops; truck crops; cereals; winter cereals; wheat; barley; oats; summer cereals; sorghum; Indian corn; forage crops; wild forage; fallow-land forage; forage of natural meadows and prairies; cultivated forage; leguminous crops; alfalfa, or lucern; horse beans; sulla; fenugreek; berseem; vetches; tree crops as forage; carob, or St. John's bread; Indian fig; miscellaneous crops; tobacco; fiber plants; perfume plants—Live stock: Cattle; horses; donkeys; mules; camels; sheep; goats—Forestry: General conditions; forest products; fuel; timber; cork; tan bark; alfalfa; dwarf palm.

No. 81. Evolution of Cellular Structures. By O. F. Cook and Walter T. Swingle. 1905. 26 pp., 1 pl., 2 figs. Price, 5 cents.

CONTENTS: Introduction—The elimination of the simple-celled phase—Alternation of structural types—Sexuality a mechanism of evolution—Two types of double-celled structures—Heredity in reticular descent—Summary—Explanation of plate.

No. 82. Grass Lands of the South Alaska Coast. By C. V. Piper, Agrostologist in Charge of Forage Plant Introduction. 1905. 38 pp., 4 pls. Price, 10 cents.

CONTENTS: Introduction—The location of the grass lands: Kadiak Island; Alaska Peninsula and adjacent islands; Unalaska and the neighboring islands; Kenai Peninsula; the Yakutat plains—Important factors relating to the agricultural value of the grass lands: The abundance and permanence of native fodder plants; bluetop; beach rye; bluegrass; silver-top; Siberian fescue; sedges; Alaska lupine; fireweed; food value of native Alaskan grasses; cultivable forage crops; silage alone as a ration for milch cows; Alaskan experience in stock raising; hogs; goats; sheep husbandry; cattle; population and available markets; freights and transportation; desirability of south Alaska as a home; climate; garden products; fuel; choice of a location—Land laws applying to Alaska: Homesteads; application for a homestead for surveyed land; inceptive rights of homestead settlers; homestead settlers on unsurveyed lands; cultivation in grazing districts; homestead claims not liable for debt and not salable; soldiers and sailors' homestead rights; soldiers' additional homestead entry—Description of plates.

No. 83. The Vitality of Buried Seeds. By J. W. T. Duvel, Assistant in the Seed Laboratory. 1905. 22 pp., 3 pls., 1 fig. Price, 5 cents.

CONTENTS: Introduction—Kinds of seeds buried—How the seeds were buried—Germination tests—Relation of depth of burial to vitality—Hard seeds—Seeds of cultivated versus wild plants—Summary—Description of plates.

* No. 84. The Seeds of the Bluegrasses. I. The Germination, Growing, Handling, and Adulteration of Bluegrass Seeds. By Edgar Brown, Botanist in Charge of Seed Laboratory. II. Descriptions of the Seeds of the Commercial Bluegrasses and Their Impurities. By F. H. Hillman, Assistant Botanist, Seed Laboratory. 1905. 38 pp., 35 figs. Price, 5 cents.

CONTENTS: I. The germination, growing, handling, and adulteration of bluegrass seeds: Description of commercial and hand-gathering seeds—Grades and quality of commercial seeds—Adulteration—Weight per bushel—Germination—Growing and handling: Poa pratensis (Kentucky bluegrass); Poa compressa (Canada bluegrass); Poa trivialis (rough-stalked meadow grass); Poa nemoralis (wood meadow grass); Poa triflora (fowl meadow grass); Poa arachnifera (Texas bluegrass); Poa annua (annual bluegrass); Poa alpina (alpine meadow grass); Poa sudetica. II. Descriptions of the seeds of the commercial bluegrasses and their impurities: The bluegrasses: Key to the seeds of the more common species of Poa as found on herbarium specimens; key to commercial bluegrass seeds after preparation for market; comparison of the principal distinguishing characters of bluegrass seeds; descriptions of species; Poa pratensis L., Kentucky bluegrass, June grass; Poa compressa L., Canada bluegrass, flat-stemmed bluegrass; Poa trivialis L., rough-stalked meadow grass; Poa nemoralis L., wood meadow grass; Poa triflora Ehrh. (P. flava L., P. serotina Ehrh.), fowl meadow grass, false redtop; Poa arachnifera Torr., Texas bluegrass; Poa annua L., annual meadow grass; Poa alpina L., alpine meadow grass; Poa sudetica Haenke; Panicularia spp.; Panicularia nervata (Willd.) Kuntze, nerved manna grass, sometimes called fowl meadow grass; Panicularia americana (Torr.) MacM., reed meadow grass, water meadow grass, tall manna grass—Weed seeds commonly found with commercial bluegrass seeds: Bursa bursa-pastoris (L.) Britton, shepherd's-purse; Lepidium virginicum L., peppergrass; Cerastium vulgatum L., mouse-ear chickweed; Alsine media L., common chickweed; Alsine graminea (L.) Britton; Carduus arvensis (L.) Robs., Canada thistle; Taraxacum taraxacum (L.) Karst., dandelion; Matricaria inodora L., scentless camomile; Hieracium sp., hawkweed; Anthemis cotula L., dog fennel, mayweed; Chenopodium album L., lamb's quarters, pigweed; Plantago lanceolata L., rib-grass, buckhorn, English plantain; Rumex cripspus L., curled dock; Rumex acetosella L., sheep's sorrel, sorrel; Veronica arvensis L., corn speedwell; Juncus tenuis, Willd., slender rush; Juncoides campestre (L.) Kuntze, field rush; Juncoides albida DC., wood rush; Carex cephalophora Muhl., oval-headed sedge—Ergot occasionally found in commercial bluegrass seed: Claviceps purpurea (Fr.) Tul., ergot.

* No. 85. The Principles of Mushroom Growing and Mushroom Spawn Making. By B. M. Duggar, Professor of Botany in the University of Missouri, and Collaborator of the Bureau of Plant Industry. 1905. 60 pp., 7 pls. Price, 10 cents.

CONTENTS: Introduction—General considerations—Market conditions—Germination studies: Review of earlier work; experimental work—Tissue cultures—Nutrition: Growth on manure and other complex media; growth on chemically known media; tabulation of special results; acid and alkaline media—Temperature and moisture—Preparation of the compost—Installation of beds—Spawning and casing the beds—Mushroom growing: Experiments at Columbia, Mo.; variability in mushrooms grown under different conditions; the cultivation of various species of mushrooms; cooperative experiments—Cave facilities in the United States—Open-air culture—Mushroom spawn making: A "chance" method; a "selective" method; pure-culture precautions; the tissue-culture method; the commercial process—The vitality of mushroom spawn.

No. 86. Agriculture Without Irrigation in the Sahara Desert. By Thomas H. Kearney, Physiologist. 1905. 30 pp., 5 pls., 1 fig. Price, 5 cents.

CONTENTS: Introduction—Population—Climate—Water supply—Soils—The date gardens: Planting; care of palms; fighting the sand; manuring; harvest; yields; varieties chiefly grown—Conclusion—Description of plates.

No. 87. Disease Resistance of Potatoes. By L. R. Jones, Botanist of the Vermont Agricultural Experiment Station and Collaborator of the Bureau of Plant Industry. 1905. 39 pp. Price, 5 cents.

CONTENTS: Introduction—Potato culture in Europe—Observations on potato diseases and disease resistance in Europe: Certain minor diseases; internal brown spot; filosité, or growing-out; leaf-spot; scabbiness of tubers; potato scab; varietal resistance to scab; other scab-like diseases; potato stem diseases; blackleg; other stem diseases; late-blight and rot due to Phytophthora infestans—Resistance as shown toward late-blight and rot: Historical statement; the meaning of disease resistance; disease resistance and vegetative vigor; the relation of hybridity to disease resistance; improvement by selection; are early or late varieties the more resistant?; relation of source of seed and cultural methods to disease resistance; composition and character of tubers as related to rot resistance; character of stem and foliage as related to disease resistance—Disease-resistant varieties of Europe: Great Britain; Germany and Holland; France and Belgium—Disease-resistant varieties of America: Investigations at the experiment stations; work at the Vermont station; information secured by a circular of inquiry; resistance to scab—Summary.

No. 88. Weevil-Resisting Adaptations of the Cotton Plant. By O. F. Cook, Bionomist in Charge of Investigations in the Agricultural Economy of Tropical and Subtropical Plants. 1906. 87 pp., 10 pls. Price, 10 cents.

Contents: Introduction—Selective influence of the boll weevil—General protective characters: Dwarf habit and determinate growth of Kekchi cotton; variations in the Kekchi cotton; effects of Guatemalan conditions on United States varieties; acclimatization of Kekchi cotton in the United States; early bearing facilitated by long basal branches; early rejection of superfluous squares; seasonal bearing of perennial varieties; annual cutting back of perennial varieties; hairy stalks and leaf stems; pendent bolls—Extrafloral nectaries: Nectaries of the leaves; external nectaries of the involucre; inner nectaries of the involucre; nectaries of Guatemalan Sea Island cotton; continued secretion of nectar; bractlets subtending inner nectaries; efficiency of the kelep protection; other nectar-bearing plants visited by the keleps—The involucre as a protective structure: Involucral bracts grown together; appressed margins of bracts; large involucres of Kekchi cotton; opening, or flaring, of bracts avoided; hairy margins of involucral bracts; extent of protection by involucre; advantage of open involucres—Behavior of parasitized buds: Shedding of weevil-infested squares; countings of flared and fallen squares; proliferation of internal tissues of buds; causes and conditions of bud proliferation; proliferation in other varieties—Protection of the bolls: Persistence of flowers; immunity of very young bolls; rapid growth of young bolls; thick-walled bolls; tough linings of chambers of bolls; proliferation from the wall of the boll; time required for proliferation; efficiency of adaptive characters of bolls; bacterial diseases following weevil injuries; breeding in buds a derived habit; relation between proliferation in buds and in bolls—Protection of seeds by lint: Protective seed arrangement in Kidney cotton—Cultural value of Kidney cotton—The nature and causes of adaptations—Conscious and unconscious selection—Summary of adaptations: Classification of adaptations; adaptive characters of different types of cotton—Concluding remarks—Description of plates—Index.

No. 89. Wild Medicinal Plants of the United States. By Alice Henkel, Assistant, Drug-Plant Investigations. 1906. 76 pp. Price, 5 cents.

Contents: Catalogue of common and scientific names of wild medicinal plants, with descriptions, statements as to geographical distribution, parts used, etc.

No. 90. Miscellaneous Papers. * I. The Storage and Germination of Wild Rice Seed. By J. W. T. Duvel, Assistant. II. The Crown-Gall and Hairy-Root Diseases of the Apple Tree. By George G. Hedgcock, Assistant. * III. Peppermint. By Alice Henkel, Assistant. IV. The Poisonous Action of Johnson Grass. By A. C. Crawford, Pharmacologist. 1906. 34 pp., 5 pls., 3 figs. Price, 5 cents.

Contents: The storage and germination of wild rice seed: Introduction—Distribution—Habitat—Germination of the seed—Fall seeding versus spring seeding—Directions for storing the seed—Detailed conditions and results of storage experiments—Packing for transportation—Methods of making germination tests—Effect of temperature on germination—Summary—Description of Plates I and II. The crown-gall and hairy-root diseases of the apple tree: Introduction—Two distinct diseases, crown-gall and hairy-root—Types of apple crown-gall—Effect upon the length of life of the apple tree—Suggestions to nurserymen—Data desired. Peppermint: Description—Countries where grown—Peppermint cultivation in the United States—Cultivation: Conditions injurious to crop—Harvesting and distillation—Description of still—Peppermint oil and menthol—Export of peppermint oil—Prices of peppermint oil. The poisonous action of Johnson grass.

No. 91. Varieties of Tobacco Seed Distributed in 1905–6, with Cultural Directions. By A. D. Shamel and W. W. Cobey, In Charge of Tobacco Breeding Experiments, Laboratory of Plant Breeding. 1906. 40 pp., 9 pls. Price, 5 cents.

CONTENTS: Introduction—Description of varieties: Cigar-wrapper tobaccos; Sumatra; Connecticut Havana; Connecticut Broadleaf; cigar-filler tobaccos; Cuban; Zimmer Spanish; Little Dutch; pipe tobaccos; North Carolina Bright Yellow; Maryland Smoking; plug tobaccos; White Burley; Orinoco and Yellow Mammoth; Virginia types (Blue Pryor, Sun-Cured, and White Stem)—Directions for culture: Sumatra tobacco; Connecticut Havana tobacco; Connecticut Broadleaf tobacco; Cuban tobacco; Zimmer Spanish and Little Dutch tobaccos; Maryland Smoking tobacco; North Carolina, Tennessee, and Virginia tobaccos; White Burley tobacco—Insect enemies—Directions for saving seed—How to secure good seed—Description of plates.

* No. 92. Date Varieties and Date Culture in Tunis. By Thomas H. Kearney, Physiologist, Plant Breeding Investigations. 1906. 112 pp., 10 pls., 52 figs. Price, 25 cents.

CONTENTS: Introduction—Characteristics of the region: Geography; the Jerid; the Nefzaoua; Gabes; Gafsa; climate; temperature; atmospheric humidity; precipitation; irrigation and drainage; water supply; irrigation system; drainage system; soils of the Jerid region; texture; fertility; alkali—Culture of the date palm: Size and value of the gardens; labor and tenantry system; propagation; preparing the land; planting; irrigating; manuring; other cultural methods; pollination and male palms; ripening; harvesting; preserving—Varieties of the date palm in Tunis: Descriptions of the varieties; varieties of primary importance; soft dates; dry dates; varieties of secondary importance; dry dates; soft dates; varieties of minor importance; dry dates; soft dates; varieties imported but not included in the key; varieties included in the key but not imported; descriptive key to the characters of the fruits; synopsis of the groups; key to the varieties—Index—Description of plates.

* No. 93. The Control of Apple Bitter-Rot. By W. M. Scott, Pathologist. 1906. 36 pp., 8 pls., 1 fig. Price, 10 cents.

CONTENTS: Introduction—The disease and its cause: The diseased spots on the apple; the bitter-rot fungus; the mycelium; summer spores; ascospores; germination of the spores; bitter-rot cankers on the branches; source of infection and spread of the disease; influencing conditions; weather; moisture; temperature; susceptibility of different varieties—Remedial measures—The Virginia experiments: The experimental trees; the plan of the experiment; object; spraying scheme; weather conditions attending the experiment; results; beneficial effects of spraying; effect of the treatment on other diseases; scab; leaf-spot; sooty-blotch; injurious effects of the treatment; russeting; coating of Bordeaux mixture—Commercial operations: Results in several orchards—Preparation of Bordeaux mixture—Method of applying Bordeaux mixture—Conclusions and recommendations—Description of plates.

* No. 94. Farm Practice with Forage Crops in Western Oregon and Western Washington. By Byron Hunter, Assistant Agriculturist, Farm Management Investigations. 1906. 39 pp., 4 figs. Price, 10 cents.

Contents: Introduction—Description of the region—Haymaking: Conditions governing stage at which hay should be cut; curing hay; hay caps—The silo—The nature of leguminous plants—Forage crops: Red clover; methods of sowing; the seed crop; alsike clover; common vetch; methods of sowing; soiling; the hay crop; the seed crop; pearl vetch; field peas; alfalfa; methods of sowing; inoculation; timothy; the rye-grasses; orchard grass; meadow fescue; velvet grass; Indian corn; rape; the seed crop; thousand-headed kale; methods of sowing; feeding; the seed crop; root crops; soiling (green feeding) crops—Seeding timber burns and burnt slashings.

No. 95. A New Type of Red Clover. By Charles J. Brand, Assistant Physiologist, Laboratory of Plant Life History. 1906. 48 pp., 3 pls., 2 figs. Price, 10 cents.

Contents: Introduction—The importance of clover culture—Domestic versus foreign seed—Objections of European growers to American red clover—Hairy clover a cause of bloating—Some general objections to the growing of clover—Certain objections overcome by new type of clover—Disadvantage of lateness of maturing under some conditions—Heavy yield of first crop and accruing advantages—Other points of excellence of hairless clover—Effect of persisting basal leaves on quality of hay—Lateness of hairless clover with reference to insect ravages—Effect of lateness of maturing when seed production is desired—Sections particularly suited to the cultivation of the new type—Seed of new type indistiguishable from ordinary form—Plans of experiments, origin of seed, and methods of procedure—Sources of Russian clover seed except No. 16—Source from which Russian seed No. 16 was obtained—The soil and climate of Orel—Purity and germination of seed used in experiments—Detailed description of experiments: The experiment in Nebraska; location; soil; drainage; preparation of land and seeding; general weather conditions during 1904; comparison of strains of clover on entering the winter of 1904; comparison of early growth of certain strains of clover; weather during growing season of 1905; earliness of varieties and order in which they matured; yield of the Orel clover compared with other strains; the experiment in South Dakota; location; soil and drainage; preparation of land, seeding, and subsequent treatment; weather conditions during 1904 and 1905; comparison of yields; the experiment in Minnesota; location, soil, and drainage; preparation of land, seeding, and subsequent treatment; weather conditions during 1904 and 1905; comparative condition of different strains of clover in the spring of 1905; yields of green matter; comparison of clover No. 16 with other strains; yields of field-cured hay; order in which the various strains matured; comparison of yields of field-cured hay; the experiment in North Dakota; location, soil, and drainage; preparation of land, seeding, and subsequent treatment; weather conditions during 1904 and 1905; comparison of yields—Other experiments in which clover No. 16 was included—Description of new type and name proposed—Later observations—Summary—Description of plates.

* No. 96. Tobacco Breeding. By A. D. Shamel and W. W. Cobey, In Charge of Tobacco Breeding Experiments, Plant Breeding Investigations. 1907. 71 pp., 10 pls., 14 figs. Price, 15 cents.

Contents: Introduction—The great variability of tobacco plants—The introduction and acclimatization of varieties—The structure and arrangement of flowers—The necessity for inbreeding—The improvement of the shape of leaves—The modification of the size of leaves—The control of the number of leaves on individual plants—The production of nonsuckering types—The production of early varieties—The improvement of the burning quality—The selection of seed plants: Records of breeding work made in the field; permanent records of breeding work—Methods of saving seed—Seed separation—Disease resistance—A new variety produced by seed selection: Uncle Sam Sumatra—New varieties produced by hybridization and seed selection: The Cooley Hybrid; the Brewer Hybrid—Description of plates.

* No. 97. Seeds and Plants Imported During the Period from December, 1903, to December, 1905. Inventory No. 11; Nos. 9897 to 16796. 1907. 255 pp. Price, 30 cents.

Contents: Introductory statement—Inventory of seeds and plants imported—Index of common and scientific names.

No. 98. Soy Bean Varieties. By Carleton R. Ball, Agronomist, Grain Investigations. 1907. 30 pp., 5 pls. (including 1 in colors), 2 figs. Price, 15 cents.

Contents: Origin and introduction of the soy bean—Variability—Classification: Key to the varieties—Descriptions of the varieties: Black-seeded group; Buckshot; Nuttall; Kingston; Ebony; Flat King; Riceland; brown-seeded group; Ogemaw; Eda; Baird; Brownie; mottled-seeded group; Hankow; Meyer; green-seeded group; Samarow; Guelph; greenish-yellow-seeded group; Yosho; Haberlandt; Tokyo; yellow-seeded group; Ito San; Manhattan; Butterball; Amherst; Hollybrook; Mammoth—List of synonyms—Distribution numbers—Description of plates.

* No. 99. A Quick Method for the Determination of Moisture in Grain. By Edgar Brown, Botanist in Charge of the Seed Laboratory, and J. W. T. Duvel, Assistant in the Seed Laboratory. 1907. 24 pp., 12 figs. Price, 5 cents.

Contents: Quality of export corn—Causes of deterioration—The percentage basis for moisture determinations—Description of a method for the rapid determination of moisture—Preparation of samples for moisture determination: Taking the bulk sample; taking the sample for the moisture test; size of sample for the moisture test; weighing the sample for the moisture test; grinding the grain unnecessary—Oil for the moisture test: Quality required; quantity required—Description of the apparatus: The evaporating chamber; the condenser; the stand supporting the evaporating chamber and condenser; the distillation flasks; the thermometers; the condenser tubes; the graduated cylinders for collecting and measuring the water—Comparison of results with determinations made in a water oven: Variations in duplicate tests—Summary.

No. 100. Miscellaneous Papers. * I. Cranberry Spraying Experiments in 1905. By C. L. Shear, Pathologist. * II. The Wrapping of Apple Grafts and Its Relation to the Crown-Gall Disease. By Hermann von Schrenk, Special Agent, and George G. Hedgcock, Assistant. III. Garlicky Wheat. By J. W. T. Duvel, Assistant. * IV. Methods of Testing the Burning Quality of Cigar Tobacco. By Wightman W. Garner, Scientific Assistant. * V. The Drug Known as Pinkroot. By W. W. Stockberger, Expert. VI. Orchard Grass. By R. A. Oakley, Assistant Agriculturist. VII. The Effect of Copper upon Water Bacteria. By Karl F. Kellerman, Physiologist, and T. D. Beckwith, Scientific Assistant. VIII. Conditions Affecting Legume Inoculation. By Karl F. Kellerman, Physiologist, and T. R. Robinson, Assistant Physiologist. 1907. 83 pp., 9 pls., 6 figs. Price, 25 cents.

CONTENTS: Cranberry spraying experiments in 1905: Introduction—Spraying and its results—Importance of early applications—Effects of spraying plants when in full bloom—Keeping qualities of sprayed and unsprayed fruit—Cost and recommendations. The wrapping of apple grafts and its relation to the crown-gall disease: Introduction—Account of experiments—Manner of wrapping—Grafts left unwrapped—Results of wrapping: Effect upon the union; effect on crown-gall formation—Recommedations—Suggestions to nurserymen—Summary. Garlicky wheat: Introduction—Wheat containing garlic—Experiments in separating garlic from wheat: Lot A; lot B; lot C—The total cost of drying and cleaning garlicky wheat: The net cost of removing garlic—The effect of the drying on the milling qualities of the grain—The effect of the drying on the vitality of the wheat—Machinery used for drying and cleaning—Summary. Methods of testing the burning quality of cigar tobacco: Introduction—The smoking test—The effects of the filler, the binder, and the wrapper on the burn of the cigar—Testing the capacity for holding fire and the evenness of the burn—Testing the burn of cigar-filler tobacco. The drug known as pinkroot: Introduction—Trade varieties of pinkroot—Identity of chief substitutes—Minor adulterants—Methods of distinguishing pinkroot from its substitutes. Orchard grass: Introduction—Methods of culture: Seeding; mixtures with red clover; mixtures with other grasses; life of meadows—Uses and value: Hay; pasture; seed; harvesting the seed crop; thrashing; handling the aftergrowth; value of the straw; weeds in orchard grass seed fields; other grasses in fields intended for seed—Summary. The effect of copper upon water bacteria: Introduction—Resistance of various bacteria—Effect of carbon dioxid on viability of Bacillus coli and Bacillus typhi—Copper sulphate and filtration. Conditions affecting legume inoculation: Introduction—Use of lime—Effect of soil conditions upon bacteria—Effect of heavy inoculation—Effect of æration—Associative action of bacteria—Summary.

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Bulletins of which indexes were printed as a part of their contents are not now indexed with the same fullness as others, the reader being referred to the complete indexes to be found in Bulletins Nos. 53, 58, 88, and 92; to indexes of plants (mainly grasses and forage plants) in Bulletins Nos. 9, 12, 15, 38, 59, 68, and 75; to indexes of the common and scientific names of seeds and plants imported in Bulletins Nos. 5, 66, and 97, while Bulletins Nos. 56 and 89 are themselves alphabetical indexes.

Bibliographies covering the subjects treated will be found in Bulletins Nos. 2, 14, 16, 37, 44, 55, 56, 58, 65, and 79.

Wherever a subject is treated practically throughout an entire bulletin, the word *bulletin* follows to indicate this fact. Similarly, *paper* is added to an entry covering a part (advance sheets) of a bulletin subsequently reprinted in complete form.

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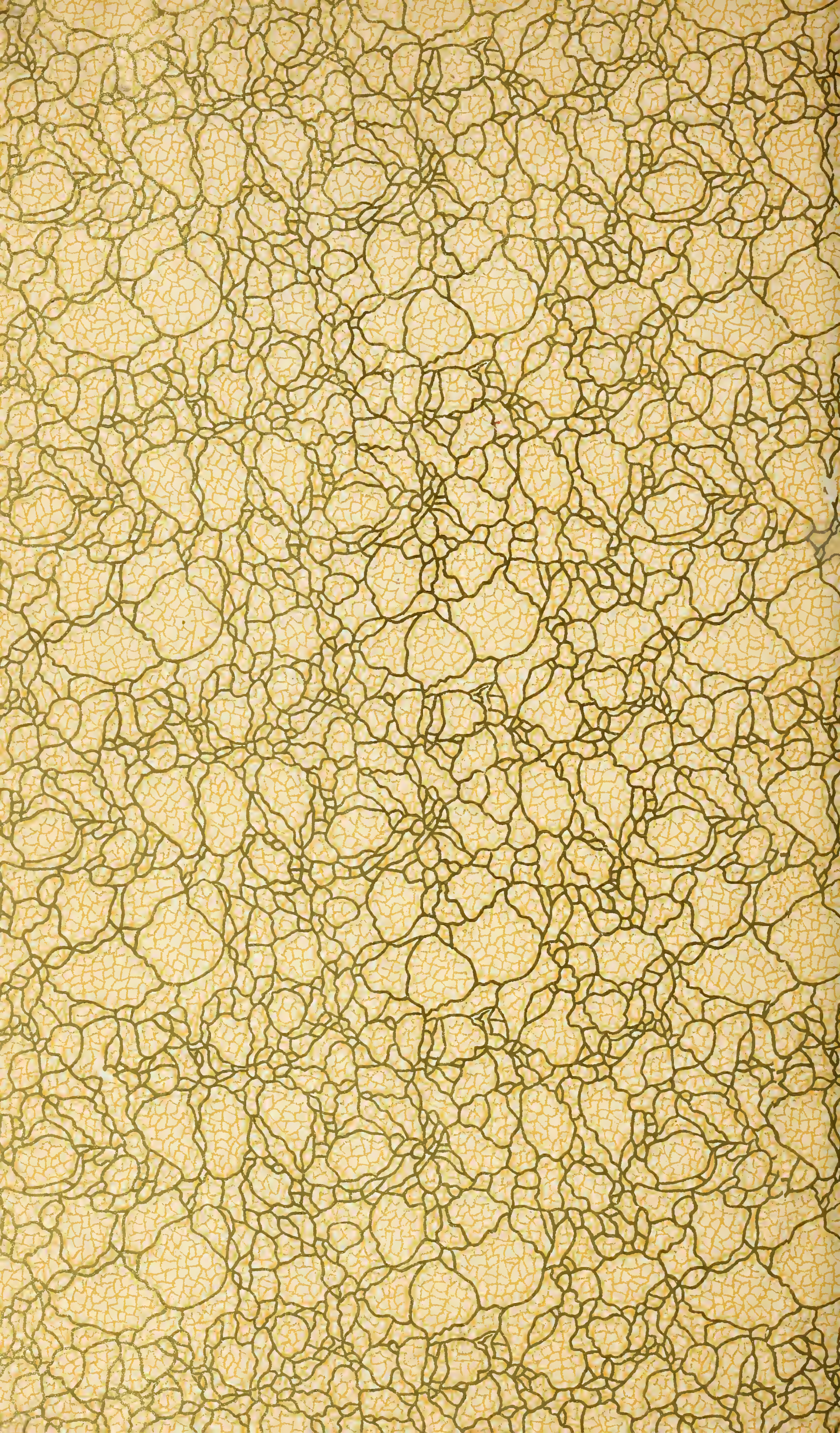

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